

Printing Colour 1400–1700

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VOLUME 41

The Handpress World

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VOLUME 32

Printing Colour 1400–1700

History, Techniques, Functions and Receptions

Edited by

Ad Stijnman and Elizabeth Savage



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Cover illustration: Detail of fig. 8.1. *Arms of Matthäus Lang von Wellenburg as Cardinal-Archbishop of Salzburg*, colour woodcut from seven blocks, 12.6 × 8.9 cm. Frontispiece to *Liber selectarum cantionum*, ed. Ludwig Senfl (Augsburg: Sigmund Grimm and Marx Wirsung, 1520) London, British Museum, 1862,0208.55, enhanced. Image produced by the Centre for Heritage Imaging and Collection Care, University of Manchester, © The Trustees of the British Museum.

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Foreword

If you adorned it [the print] with colour, you would
injure the artwork

ERASMUS OF ROTTERDAM, 1528¹

Printen beverven is printen bederven.

To colour prints is to corrupt prints.

WILLEM GOEREE, 1668²

Since the beginnings of the academic study of the history of graphic art two hundred years ago, much has been made of early prints' essential black-and-whiteness. Claims that their starkness expressed a Reformation-era aesthetic or that their multiple nature standardised visual information and thus enabled scientific revolutions are familiar. In the last decade, it has been increasingly appreciated that hand-coloured (i.e. painted) impressions are frequently found in art and rare book collections but poorly represented in collection catalogues (and thus in art and book historical studies). Amongst other reasons, hand-colouring was long derided by collectors, scholars and theorists as a later, amateurish addition that hid the 'real' art of the printed image. This aversion to colour in prints is attested most famously in the writing of Erasmus of Rotterdam³ and in Willem Goeree's warning above.

Goeree's memorable rhyme, which can be translated literally as 'to paint prints is to corrupt prints', has been repeatedly cited as an early warning against cheapening prints with colour. However, the original context makes it clear that Goeree was rallying against *bad* painting, not *all* painting, on prints:

And because one often sees that to paint prints is to corrupt prints, *unless it does not move a little closer to the Art of Painting*, we have – to the pleasure of Art-lovers – added something here and there throughout [this manual] concerning the Painting with Water-colours, because it corresponds to Illumination in many aspects [emphasis added].⁴

1 '...ut si colorem illinas, iniuriam facias operi', in reference to prints by Albrecht Dürer. Erasmus of Rotterdam, *De recta Latini Graecique sermonis pronuntiatione dialogus* (Basel: Froben, 1529), 19.

2 W. Goeree, 'Verlichtery-konst', appendix to *Inleydinge Tot de Al-ghemeene Teycken-Konst*, 1st ed. (Middelburgh: Wilhelmus Goeree, 1668), [4].

3 For an alternate interpretation of his praise of Dürer as the 'Apelles of line', see E. Panofsky, 'Erasmus and the Visual Arts,' *Journal of the Warburg and Courtauld Institutes*, 32 (1969): 226–27.

4 Ibid., [4]: 'Ende dewijl men veeltijds siet dat Prenten beverven, is Prenten bederven, indien het niet wat verder over gaet tot de Konst van Schilderen, soo hebben wy hier en daer door-gaens, tot vernoegingh van de Konst-beminders, yets by ghevoeght, raeckende eygentlijk het Schilderen met Water-verwen, alsoo het in veelen met de Illuminatie is over-een-komende'.

Like his contemporaries, Goeree was not at all opposed to the hand-colouring of prints. He simply felt that unskilled hand-colouring was so unpleasant that he hoped to remedy it with the information in his manual. In 1668, when his revised edition of the first published manual on the hand-colouring of prints (Geeraard ter Brugge[n]'s *Verlichtery kunst-boeck* of 1616)⁵ was published, Goeree ensured that readers had the necessary skill base by supplementing the recipes with his own instructions for watercolour painting. Two years later, in his second revised edition (1670), Goeree added that 'Nice and beautiful things can also be made in Water-Colours, as well as from those which one Invents, Draws, Copies, or follows after life, as Impressed Paper Print-Art'.⁶

Prints were often painted by contemporary users even after the rise of elite Neoclassical tastes for visual purity in the late 1700s and early 1800s. This shift coincided with the development of the academic study of the history of graphic art, in which it manifested as the pursuit of black-and-whiteness, and it continues to influence scholarship. For example, no standard formal descriptive vocabulary or cataloguing protocols have yet been formulated to record colour in early modern printed material. The painting of prints began to be recognised and celebrated by scholars only around the turn of the twentieth century. This sea change brought about a new appreciation for hand-coloured prints and led to much new important information about the production and use of colour in early modern European print and book culture. However, the old bias against colour has remained so entrenched that some dealers still sell painted impressions at a steep discount, and even online rather than in store.

Early modern impressions that were *printed* in colour, not *painted* after the fact, or 'colour prints' as opposed

5 G. ter Brugghen, *Verlichtery kunst-boeck: inde welke de rechte fondamenten, ende het volcomen gebruyck der illuminatie met alle hare eygenschappen klaerlijcken werden voor oogen gestalt*, 1st ed. (Amsterdam: Herman Allersz. Koster, 1616). The two later editions (Leyden 1634, Amsterdam 1667) are little altered.

6 W. Goeree, *Verlichterie-kunde* (Middelburg: Wilhelmus Goeree, 1670), [9]: 'Oock konnen door de Water-Verwen aerdtige en fraye dingen gemaect worden, soo wel van die gene welckmen selfs Inventeert, Teyckent, Copeyeert, ofte na het leven volghet, als Opedruckte Papiere Print-Kunst'.

to 'coloured prints';⁷ have long been considered great rarities. Histories of colour printing in the West often acknowledge several famous earlier outliers but begin with Jacob Christoff Le Blon's⁸ great technical breakthrough of c.1700: the invention of trichromatic printing. This approach, in which impressions of tone plates with blue, yellow and red inks were superimposed in that order (eventually with a first plate in black or an extra blue plate to speed up work and enhance the shades), enabled the first reproductions in accurate colour. It evolved into the RGB (red-green-blue) and CMYK (cyan-magenta-yellow + key [black]) colour systems that we still use today.⁹ Making use of two recent major developments that have enabled research into colour printmaking, this volume provides the first overview of the thousands of images printed in colour before Le Blon's turning point.

Firstly, it is significant that this volume itself has over 100 illustrations of prints in accurate colour. Given the prohibitive expense and difficulty of illustrating scholarly publications in colour before the large-scale introduction of digital processes in printing in the 1980s, print historians often selected unpainted, black-on-white examples because they reproduced better in both line and half-tone reproductions. As accuracy increases and cost decreases, colour illustrations are becoming the norm even in print scholarship; two leading publications in the field, the Hollstein series and the journal *Print Quarterly*, shifted to full colour in 2011. The ability to reproduce detailed photographs of printed *objects* in realistic colours rather than black-on-white *designs*, first in print and now online, has made it possible for researchers to appreciate the impact of (painted or printed) colour in graphic media.

Secondly, thousands of colour impressions printed before Le Blon's invention have recently come to light through digitisation projects that happen to record colour in prints. This emerging critical mass is overturning fundamental assumptions about early modern print culture.

Because their printed colour was not a later addition but integral to their design, their production required new materials and printing techniques that must revise our understanding of workshop practices. Research into them requires novel interdisciplinary approaches based on a practical understanding of historical printing techniques and materials. As with hand-colouring, cataloguing standards have made their printed colour difficult for researchers to find; as awareness and appreciation spread and cataloguing standards develop, it is certain that more will be identified.

The study of early modern printing has changed radically since 2010, when our work on early modern colour prints and printmaking techniques (intaglio and relief, respectively) brought us into contact with each other and others conducting research on related technical, art historical and bibliographical questions. At that time, these pioneering projects were narrowly focused on individual designers and printers, stylistic trends in specific areas or times, or individual functions of colour-printed material. Together they were forging a field of research: colour printing in the early handpress period. To gather these diverse and original lines of enquiry, we organised the first forum for the discussion of this topic, the conference *Impressions of Colour: Rediscovering Colour in Early Modern Printmaking, c.1400–1700*, at the Centre for Research in the Arts, Social Sciences and Humanities, Cambridge University (8–9 December 2011). Its object-based focus was furthered by displays of dozens of exhibits at the Fitzwilliam Museum and Cambridge University Library, and its emphasis on the making of prints was boosted by a hands-on demonstration of historical colour relief printing techniques in the University Library's working collection of historical printing presses. Support from sponsors as varied as the Gerda Henkel Stiftung, Hes & De Graaf Publishers and The Bibliographical Society indicates the interdisciplinarity of the discussions, which engaged art historians, conservators, bibliographers, curators, scientists, rare book librarians, dealers and practicing printers.

At the conference, the groundbreaking content of the papers made evident the need for a handbook that encompassed the production of impressions in colour across Europe from the earliest attested efforts around 1400 until the major advances around 1700. The announcement of ten (then) forthcoming exhibitions and major publications on diverse aspects of early modern colour printing within the next five years, which would effectively equal the number of previous major research outputs in this area in the last century, made that need urgent. Because the production of these prints required

7 On this distinction, see A. Griffiths, *Prints and Printmaking: An Introduction to the History and Techniques*, rpt. of 2nd ed. (Oakland: University of California Press, 2010), 113.

8 The spelling of Le Blon's given names is according to the Frankfurt baptismal registers; see O.M. Lilien, *Jacob Chistoph Le Blon 1667–1741: Inventor of Three- and Four Colour Printing* (Stuttgart: Hiersemann, 1985), 11–12.

9 RGB = Rot, Grün, Blau (red, green, blue) is used for additive colour mixing for light-emitting devices, such as computer and television screens. CMYK = cyan (bright, slightly greenish blue), magenta (bright purplish pink), yellow (bright lemon yellow), and key (black, i.e. 'from the keyplate', which is normally inked in black) is used for subtractive colour mixing, such as for paints and printing inks.

materials, techniques and specialist knowledge that often went beyond the known black-on-white printing methods, including some previously undescribed processes, it was clear that the handbook would have to be wide-ranging, interdisciplinary and grounded in the materiality and production of the objects. Thus, this volume was born.

The genesis of *Printing Colour 1400–1700* may have been in the conference Impressions of Colour, but it is an independent product with a far broader scope. Its name distinguishes it from the conference and reflects its technical emphasis. Some chapters are connected to papers presented at the conference, directly or indirectly, and others are from experts who were invited to contribute so that this volume could present a fuller picture of current scholarship. Given the breadth of its scope, some omissions are inevitable. For example, there is a clear need for studies of colour print collectors and the early modern reception of colour prints, as well as the scientific analysis of many more colour printing inks and their changes in appearance over time. Nevertheless, the structure and contents of the book survey the present state of knowledge.

A number of common themes emerge from the contributions. For instance, many discuss the expanded creative role of printers and publishers; especially for later impressions, a later printer or publisher, not the prints' original artist or designer, chose the colours of ink and/or commissioned new matrices to add printed colour. Most make reference to the pressing need for cataloguing rules and standard descriptive vocabulary to record and classify colour printing techniques, especially conventions that could be adopted across the history of art and bibliography. Another dominant trend is interdisciplinarity, especially with reference to the developing technical turn in the history of graphic art and bibliography; for instance, art historical studies in this volume may draw on bibliographical assessments and the elemental analysis of printing inks to refine the dating and attribution of prints. This volume is just a starting point, and it is hoped that it will spur the further development of these object-based methodologies and research questions, as well as the identification of additional early modern colour impressions. Many more are waiting to be found.

Ad Stijnman and Elizabeth Savage

Preface: The Problem of Printing in Colour

Peter Parshall

It is often said that colour has played only a minor role in art historical research relative to its importance for the history of art in general. Although this is undoubtedly true, the problem overall lies not so much in conscious neglect as in the nature of colour itself. As many commentators from Pliny to John Locke have pointed out, colour is a secondary quality of things, an unstable datum in our collective experience. We do not have, and probably cannot have, a precise vocabulary for identifying its nuances. And although we may stand beside one another in the same light and agree that a particular drapery is painted in a purplish-green hue, whether we are actually experiencing the same thing is only a matter of consensus. Unable to be confirmed or disconfirmed, it is unscientific, more on the order of an emotion than a material fact. Along with the epistemological uncertainties there are also practical considerations. Partly because of the difficulty of accurately reproducing colour, scholars were taught to neglect it, and it was rarely employed as empirical evidence in refined arguments about style, connoisseurship and even iconography. For instance, I was told as a graduate student to ignore the colour in the slides because it was so deceptive. The comparative facility with which we can now record colour photographically, however, is beginning to make a difference.¹

For these reasons among others a comprehensive history of colour printing in Europe from its beginnings in the fifteenth century to the major breakthroughs of the eighteenth century has yet to be written. The lacuna is particularly notable since the story of printing itself has been told ad infinitum, although it should be said that the chronicle of printing in colour is largely episodic and repetitive, making it an awkward fit in the standard accounts of printmaking, book printing, and the history of art altogether. Perhaps equally significant, the close study of colour printing requires an understanding not just of the history of art, but also the history of the book, where printing in colour actually began. Once the transition

from manuscript to print was relatively complete the discipline of art history more or less abandoned this aspect of its subject matter, which explains why we also lack a thorough overview of the history of illustration. It is a distinguishing feature of the papers in this volume that the uncomfortable divide between art history and the history of the printed book is crossed and re-crossed confidently and often.

Colour was an important formal element in printmaking almost from the start, since we can reasonably assume that the earliest woodcuts were often if not usually made with the expectation that they would be coloured by hand. Therefore, it comes as no surprise that the first concerted experiments in colour printing – those undertaken in Venice and Augsburg by Erhardt Ratdolt – were made to look as much as possible like the hand-coloured woodcuts that preceded them.² These initial forays are interesting for several reasons, but for present purposes it is sufficient to point out that they represent not so much an innovation as an attempt at making accepted practice more efficient. Printing local colour from multiple blocks or by means of friskets worked perfectly well apart from the occasional difficulty in registration, a problem that has persisted throughout the history of colour printing and begs to be looked at as a topic in itself. In any event, from the aesthetic and commercial perspectives, localised inking – including the introduction of stencils,³ which came into greater use around 1500 – simply could not compete effectively with hand-colouring.

Given that the fundamental components of a printed sheet are black ink and white paper, colour (like illustration) first tended to be an embellishment rather than a

1 For an account of the history of colour in western art that is as wide ranging as it is probing and reflective see J. Gage, *Color and Culture: Practice and Meaning from Antiquity to Abstraction* (Boston, Toronto, and London: Little Brown and Co., 1993). See also Bamber Gascoigne's Sandars Lectures of 1994, *Milestones of Colour Printing 1457–1859* (Cambridge: Cambridge University Press, 1997). Despite much useful information it constitutes a history only to the degree that the title suggests.

2 See E. Savage, 'A Printer's Art', this volume, 93–103.

3 On the early use of stencils in hand-colouring see T. Primeau, 'Coloring Within the Lines: The Use of Stencil in Early Woodcuts', *Art in Print* 3.3, accessed 15 November 2013, http://artinprint.org/index.php/articles/article/coloring_within_the_lines_the_use_of_stencil_in_early_woodcuts; Ibid., 'The Materials and Technology of Renaissance and Baroque Hand-Colored Prints', in S. Dackerman, *Painted Prints: the Revelation of Color in Northern Renaissance & Baroque Engravings, Etchings & Woodcuts*, exh. cat. (Baltimore: The Baltimore Museum of Art; University Park, PA: The Pennsylvania State University Press, 2002), 66–68. On the use of friskets in colour relief printing see E. Savage, 'A Printer's Art', this volume, 94. We must also consider that stamping on fabric with woodcuts inked in multiple colours predated printing on paper.

requirement. There are exceptions to this such as rubrication, but rarely cases in which colour was needed to improve the use or clarify the meaning of a text. On occasion colour found practical application, for example in technical or scientific illustration,⁴ or for printed coats of arms where specific demands needed to be met. Elsewhere, printers employed local inking of woodblocks and type to brighten a text, and occasionally introduced a tone block for ornamenting a title page or an elaborate initial. In some cases these additions were managed with exceptional skill and imagination.⁵

Although printing local colour from multiple blocks never quite took hold for single-sheet prints,⁶ it yielded at least one spectacular example, Albrecht Altdorfer's six-block woodcut of the *Schöne Maria of Regensburg*.⁷ This print was made to celebrate a grim sequence of events: the expulsion of the Jews from the city of Regensburg in 1519, the destruction of their synagogue, and the campaign to build a church in its place. Altdorfer's elaborate production was probably sold as a luxury item to raise funds for the cult and the construction of the new church, which helps explain the considerable effort invested in making and printing it. The enterprise may well have been a commercial loss. The complete set of blocks had a short life, for there are only two or perhaps three surviving impressions employing all six of them, where problems in registration are manifest.⁸ Aesthetically speaking, Altdorfer's Miraculous Virgin was an extravagant failure, commensurate with the catastrophic human failing it commemorated.

4 Beautifully demonstrated in the astronomical diagrams for Johannes de Sacrobosco, Regiomontanus, and Georg von Peurbach, *Sphaera Mundi* (Venice: Erhardt Ratdolt 1485). Printed by Erhardt Ratdolt of Augsburg during his activity in Venice, it contains woodcuts in one, two and three colours.

5 See M. Ikeda, 'The Fust and Schöffner Office', this volume, 65.

6 They were much more common in book illustrations, at least in the German-speaking lands; see E. Savage, 'A Printer's Art', this volume, 93.

7 A seven-colour woodcut book illustration (including 'printed' gold) in this style was printed by Grimm and Wirsung in Augsburg in 1520. It and the music book it appeared in are described in E. Giselbrecht and E. Upper (now Savage), 'Glittering Woodcuts and Moveable Music: Decoding the Elaborate Printing Techniques, Purpose and Patronage of the *Liber selectarum cantionum*', *Senfl-Studien I*, ed. B. Lodes and S. Gasch, Wiener Forum für ältere Musikgeschichte 4 (Tutzing: Hans Schneider, 2012), 17–67.

8 F. Winzinger, *Albrecht Altdorfer: Graphik* (Munich: Piper, 1963), 84–85, presumed it was printed in large numbers since the blocks became badly worn, one disappearing completely, and others replaced. The majority of surviving impressions date from the eighteenth century.

The first three centuries of printing in colour were largely experimental and redundant, with few instances that can be claimed retrospectively as important technical, aesthetic, and commercial successes. Nevertheless, it is a remarkable record of the persistence and ingenuity of artists, printers, and publishers, not to say natural philosophers, physicians, pharmacists, painters, and many others who time and again sought better ways of doing things. Printers for their part were always looking for opportunities. They commissioned writers to compose treatises and artists to design frontispieces, retained scholars for proof-reading, when necessary found ways to avoid the censors, and were often instigators of political and religious discontent. As commercial endeavours motivated by profit, but also intersections for the dissemination and exchange of learning, printing shops were in many respects the ideal laboratories for invention. Printers dealt with engravers and woodblock cutters, and employed carpenters and metalworkers with mechanical expertise. There were always reasons to improve the efficiency by improving mechanisms and modifying procedures, and in the course of doing business printers had regular contact with every sort of competence needed to advance their techniques. Nevertheless, it required three hundred years of trial and error to invent a means of printing in colour that provided sufficient nuance to approximate a painter's palette and thus supersede the labour of hand-colouring. In a culture of rapidly emerging scientific interest and self-conscious artistic refinement, the limitations on capturing subtleties of tone and gradations of hue were far from incidental.

A revealing example of the perceived inability of printed colour to meet such practical needs is the dramatic improvement of botanical illustration during the sixteenth century. Like the anatomy of Vesalius, the illustrated herbals of Otto Brunfels (1530–36) and Leonhard Fuchs (1542) represent a measurable advance in the accuracy of depicting plant specimens drawn from life. Given the intended utility of these handbooks for the identification of medicinal plants, they were obvious candidates for developing an effective scheme for colour printing. However, not one of the major herbals in this period was ever issued in a colour-printed edition. Although many copies were coloured by hand, the empirical value of the illustrations finally rested on the linear intricacy of the woodcuts themselves. Mechanical colouring of fine detail with transparent pigments would anyhow have been hard to achieve, and unequal to what a modestly skilled illuminator might manage with relative dispatch. The difficulties of registration alone required a major effort, and the expense of cutting two or more colour blocks in addition to the line block for each illustration could make the

undertaking highly unprofitable. Finally, the debate over the usefulness of colour – more a variable than a constant in botanical identification – must also have discouraged printers from taking up the challenge.

The earliest, and in many respects most successful foray into multi-block colour printing prior to the eighteenth century, in fact the one widely celebrated example, is the so-called *chiaroscuro* woodcut. This technique with its complex, hybrid genealogy flourished mainly in the second and third decades of the sixteenth century and was then revived in its Italian Renaissance form in the eighteenth century. The aesthetic origins of the *chiaroscuro* woodcut reach well back into the fifteenth century, and the remarkable evolution of the technique north and south of the Alps tells us much about the perception of colour in the period and the particular qualities that colour offered the artist and the printer. These woodcuts are striking for two closely related reasons. First, they were formal exercises in design, initially in two or three tones of a single colour, and in this sense a purposeful departure from the mimetic objectives that dominated contemporary Renaissance theory and practice. The play of high-lights and the contrast of light and dark tone blocks are calculated for visual effect more than veracity, and although one might risk the term ‘decorative’ it would underestimate the sophistication of the medium and its audience. Second, the *chiaroscuro* woodcut is not in essence a technique for colour printing as such. Rather, it is a medium that is receptive, in fact conducive to the use of colour inks for aesthetic impact. The distinction is not merely academic; it is important to understanding why and for whom these unusual woodcuts were made.

In 1516 Ugo da Carpi applied to the Venetian Senate to protect what he claimed as a new technique for printing ‘*in chiaro et scuro*’ (in light and dark). Had he been cross-examined Ugo would doubtless have confessed to seeing an example of this printing technique somewhere before, perhaps a sheet from Augsburg.⁹ In any case, as a painter himself he would certainly have understood that his woodcuts were formally indebted to a workshop practice common in Italy for at least a century. Monochrome drawings on prepared colour paper were exercises in modelling with tones and accenting with highlights; however, a *chiaroscuro* woodcut is more an abstraction of this well-established drawing style than an imitation of it. Applying

graduated tones of colour for printing as in the later Japanese manner was not a tactic that Renaissance artists thought worthy of exploring. The problem of modelling, so essential to the use of colour for rendering form, had yet to be solved.

These woodcuts comprise a genre of their own, and have therefore proven difficult to classify in the hierarchy of Renaissance artistic practice. Giorgio Vasari seems to have especially admired a *chiaroscuro* woodcut by Domenico Beccafumi, indeed finding that it merited inclusion in his albums of drawings, and the Emperor Maximilian’s deputy Conrad Peutinger saw fit to engage the court painter Hans Burgkmair in a competition over *chiaroscuro* printing.¹⁰ Importantly, it was because they were prints and not drawings that *chiaroscuro* woodcuts became negotiable works of art intended for sale in the market and attained recognition. The best northern and Italian examples are *tours de force*, exquisite formal exercises likely to have been sought out by the same clientele that responded to exceptionally fine engravings. They are outright demonstrations of artistic virtuosity, and in fact the earliest type of colour-printed image for which we can reasonably claim this distinction.

The practice of locally inking a printing matrix by hand appeared in the early sixteenth century, remained in use for centuries and eventually became known by the French designation *à la poupée*. But its occurrences were always in some degree a compromise given the care required to do it well. Albeit labour intensive, some of these experiments resulted in much sought-after works of art in which the element of printed colour occasionally served as a preliminary to additional retouching by hand. Among the most original and intriguing of the various hybrid products entailing colour are Maria Sibylla Merian’s hand-coloured natural history illustrations made over counterproofs of her printed etchings. The counterproofs themselves were sometimes specially tailored by masking off or selectively inking a section of the impression to be transferred, and then relocating that part of the original composition in order to create a variation on the print, placing a butterfly in the upper left rather than the upper right, for example. The result is an exact replica of a published print in reverse with one or perhaps two elements out of place, in other words just what one might expect to

⁹ Or possibly, a reverse copy of Baldung’s *Preparation for the Witches’ Sabbath* (first printed in Strasbourg in 1510), which was printed in Venice in 1516, attributed to Lucantonio degli Uberti. See London, British Museum, 1852.0612.105. My thanks to Elizabeth Savage for this reference.

¹⁰ G. Vasari, *Le vite de’ più eccellenti pittori scultori e architettori nelle redazioni del 1550 e 1568*, ed. R. Bettarini and P. Barocchi, 6 vols. in 11. (Florence: Sansoni, 1966–1987) 5: 176. On the invention of the *chiaroscuro* woodcut in the North, see D. Landau and P. Parshall, *The Renaissance Print, 1470–1550* (London and New Haven: Yale University Press, 1994), 169–202.

find in a preparatory drawing. Merian offered these confections as ‘curiously illuminated’ sheets at a much higher price. At least two sets of them are known on vellum.¹¹ We could consider them to be an elite type of forgery: hand-coloured prints masquerading as preparatory drawings for the etchings. However, they are better understood in a category of their own, something more like assisted watercolour drawings. Any intent to deceive, if there was one, would have been less meaningful than the inherent appeal and ingenuity of the process itself.

The Merian counterproofs constitute a final reprise to the fifteenth century practice of hand-colouring in the tradition of manuscript illumination, but they reflect an entirely new set of conditions. Ugo da Carpi’s technique for printing his *disegni* required a privilege because he was protecting a method for making saleable works of art, namely prints and not drawings. Merian, on the other hand, was working for a market that had come to value certain kinds of drawings above prints, and so for her it was worth the considerable effort to contrive these specially tailored editions for a wealthier and more refined clientele.¹² Not long before Merian offered her own printed illustrations in colour, Johannes Teyler had begun conducting experiments with actual colour printing in intaglio. Teyler’s solution was once again a version of localised inking, and like other attempts to improve upon assembly line hand-colouring in the end his method also proved to be a novelty. Nonetheless, these many late seventeenth and early eighteenth-century trials contributed to a legacy that eventually yielded lasting results.

Johannes Teyler pursued a curiously varied career that in certain ways exemplifies the highly productive cross-currents of artisanal and technological experiment in the early scientific age. He was born in Nijmegen where he studied philosophy at the local university, completing a dissertation on the ideas of René Descartes. He continued his studies at the university of Leyden until he was called to become professor for mathematics and philosophy at Nijmegen. The siege and capture of the town by the French in 1672 and the forced closure of its university terminated Teyler’s brief academic career, after which he moved to Berlin, presumably to work as a military engineer for the Great Kurfürst of Brandenburg. Upon his return he published a slim manual on military architecture,¹³ which

eventually led to an acquaintance with Gottfried Leibniz and Christiaan Huygens. The salary he received in arrears from the university allowed him to tour Italy, where he mixed with the Dutch artistic community in Rome – the notorious Bentvueghels – and the Middle East to study fortifications. After his arrival back in Holland he opened a workshop printing luxurious wall hangings and other decorative accoutrements, including colour prints. More than a thousand impressions from over three hundred different plates printed by a process of selective inking have been associated with this workshop.¹⁴

Teyler’s migration from academic philosopher to proprietor of luxury goods holding a privilege for producing prints on fabric and in colours offers a glimpse into the amateur world of invention in the age of the scientific revolution. Although it has no obvious bearing on Teyler’s actual method of printing, it is worth remarking that Descartes studied rainbows and refraction, and that the search for a theory of colour among natural philosophers was much animated throughout the seventeenth century.¹⁵ Scholars, artists, and artisans frequently crossed paths in the quest for technical understanding, and print shops were readymade for such encounters. As Teyler’s professional biography demonstrates, that someone of his training might eventually become interested in colour printing is not so much surprising as it is symptomatic of the period.

Meanwhile, the technical aspects of printing must also have had special appeal for the artisan still resident in the mind of the artist: how the structure of a machine for applying pressure affected the qualities of an image; how the properties of the receiving support further influenced the outcome; how the problem of alignment might be controlled; how degrees of uniformity and difference should be managed. These were all matters of intense

the 1679 edition seems to have survived, as compared to the several copies of the 1697 re-edition.

11 For a lucid explanation of Merian’s entire process see S. Schrader, N. Turner and N. Yocco, ‘Natural History under the Microscope: A Technical Study of Maria Sibylla Merian’s “Metamorphosis of the Insects of Surinam”’, *Getty Research Journal*, 4 (2012): 161–72.

12 Ibid., 166.

13 J. Teyler, *Architectura militaris* (Amsterdam: [...], 1679). Although copies were seen by Leibniz and owned by Huygens, no copy of

14 Teyler should be seen as the organiser and financier of the workshop, employing engravers and plate printers. The idea of multiple-colour printing might originate from his close friend the artist Jan van Call. Although examples of the *à la poupée* method can be found from the early sixteenth century in both relief and intaglio prints, it is only in Teyler’s workshop that this manner of colour printing was carried out on a large scale for the first time. For further details and a bibliography on Teyler’s often-misrepresented history, see S. Turner, ‘*Opus typo-chromaticum*’, this volume, 196. The NH-DF volume on Teyler (forthcoming 2015) is currently being prepared by Ad Stijnman. Thanks to both Stijnman and Turner for their assistance with these details.

15 E. Jorink and B. Ramakers, ‘Undivided Territory: ‘Art’ and ‘Science’ in the Early Modern Netherlands’, *Nederlands Kunsthistorisch Jaarboek*, 61 (2011): 17–18.

curiosity in a community set on making things efficiently and to a predictable standard. Furthermore, in the increasingly mechanised model of the universe being promoted by the new science, the machine was becoming a guarantor of consistency and reliability. Like microscopes and measuring instruments, the press bore an implicit authority, which thereby impelled the continued improvement of its operations. Printing was but one arena in which artists and artisans actively participated in an agitated climate of experimentation. Painters acquired their pigments not only from specialised pigment dealers but also pharmacists who had knowledge of the plants and minerals from which their colours derived.¹⁶ One of the earliest scientific treatises on colour was composed by a physician whose eventual aim was to establish a correlation between colour and musical harmony.¹⁷ The seventeenth century saw a rash of 'books of secrets' intended for artists, artisans, and amateur inventors, often including instructions on how to render colours and dyes.¹⁸

The first three centuries of exploration into the possibilities for printing in colour directly reflect the experimental climate that was furthering scientific discovery in general. The Aristotelian emphasis on theoretical over practical wisdom was in retreat before what Pamela Smith has termed 'artisanal knowledge', which is to say the practical experience of how things actually work. As the importance of experimentation grew it was this kind of knowledge that became increasingly relied upon for dem-

onstrating the truth of many a theory.¹⁹ Like his predecessors among natural philosophers, when Isaac Newton studied the prismatic dispersion of colour he openly acknowledged the hard-won understanding of painters.²⁰ And in turn, the multi-plate, three-colour (blue-yellow-red) overlay process developed by the painter Jacob Christoff Le Blon,²¹ Maria Sibylla Merian's grand-nephew, came about in the climate of these theoretical speculations as well as a long history of experimental practice. The path – both theoretical and practical – had been well prepared for him, although his solution once again proved commercially unviable. Nonetheless, the three-colour system led to the first effective means of reproductive colour printing able to meet both commercial and aesthetic expectations, and still serves as the basis for digital colour printing.²²

The notion that the history of western science and technology was an inexorable evolution proceeding from success to success and finally to the invention of the modern world has long been abandoned. We now recognize that the false starts and *culs-de sac* also have much to tell us about how technical knowledge is eventually acquired. In addition, there is the complex matter of how at any given point aesthetic criteria become adjusted to what is technically possible, and conversely how the trade in luxury objects can propel an interest in improving technology. The history of colour printing is just such a story of setbacks, small advances, and occasional flights of ingenuity. It is therefore all the more revealing of how problems in general tend to be worked through, and how trials and local solutions can open the way to further possibilities.

16 Certain pigments were thought to be lethal poisons and others to be capable of healing. See K. Leonhard, 'Painted Poison: Venomous Beasts, Herbs, Gems, and Baroque Color Theory', *Nederlands Kunsthistorisch Jaarboek*, 61 (2011): 129–33; *Trade in Artists' Materials: Markets and Commerce in Europe to 1700*, ed. J. Kirby, S. Nash and J. Cannon (London: Archetype, 2010).

17 V.A. Scarmilionius (physician to Emperor Rudolph II), *De Coloribus* (Marburg: Paul Egenolff, 1601). See Gage, *Color and Culture*, 153–54, 230.

18 On the competition among artisans and merchants involved with mechanical inventions and instrument making in London already during the late sixteenth century: D. Harkness, '“Strange” Ideas and “English” Knowledge', in *Merchants and Marvels: Commerce, Science, and Art in Early Modern Europe*, ed. P.H. Smith and P. Findlen (New York, London: Routledge, 2002), 147–51.

19 P.H. Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago: University of Chicago Press, 2004), 17–18.

20 J. Gage, *Color and Culture*, Chap. 9.

21 On the spelling of Le Blon's given names, see the Foreword, x, nt. 8.

22 On the epistemological consequences of the interaction between art, science and commerce see T. DaCosta Kaufmann, 'Questions of Representation', in Smith and Findlen, *Merchants and Marvels*, 412–22.

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Ad Stijnman and Elizabeth Savage

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List of Abbreviations

B	A. von Bartsch, <i>Le peintre-graveur</i> , 21 vols. (Vienna: Degen/Mechetti, 1803–21); references are formatted as ‘B.[volume number].[page number].[item number]’
H-DF	<i>Dutch & Flemish Etchings, Engravings and Woodcuts, 1450–1700</i> , originally ed. F.W.H. Hollstein, 72 vols. (currently Ouderkerk aan den IJssel: Sound & Vision Publishers, 1949–2010)
H-G	<i>Hollstein’s German Etchings, Engravings and Woodcuts, 1400–1700</i> , originally ed. F.W.H. Hollstein, 80 vols. (currently Ouderkerk aan den IJssel: Sound & Vision Publishers, 1954–present)
IFF-17	<i>Inventaire du fonds français, graveurs du XVIIe siècle</i> (Paris: Bibliothèque nationale, 1939–93)
IFF-18	<i>Inventaire du fonds français, graveurs du XVIIIe siècle</i> , 15 vols. (Paris: Bibliothèque nationale, 1939–89)
ISTC	Incunabula Short Title Catalogue (http://istc.bl.uk)
NH-DF (Artist’s Name)	<i>The New Hollstein Dutch and Flemish Etchings, Engravings and Woodcuts, 1450–1700</i> (Ouderkerk aan den IJssel: Sound & Vision Publishers, 1993–present)
NH-G (Artist’s Name)	<i>The New Hollstein German Etchings, Engravings and Woodcuts, 1450–1700</i> (Ouderkerk aan den IJssel: Sound & Vision Publishers, 1996–present)
T1B	<i>The Illustrated Bartsch</i> , originally ed. W.L. Strauss and J.T. Spike (New York: Abaris Books, 1978–present)
VD16	<i>Verzeichnis der im deutschen Sprachbereich erschienenen Drucke des 16. Jahrhunderts</i> (www.vd16.de)

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Marjolein Leesberg studied Art History at the Rijksuniversiteit Utrecht, and her MA thesis 'Karel van Mander as a Painter' (1985) was published in *Simiolus* 22 (1993–94). Further research on Van Mander as a print designer resulted in her publication of his catalogue raisonné in the New Hollstein Dutch & Flemish series (1999). She has been working as compiler and editor for the Hollstein series ever since, specialising in late sixteenth-century Dutch and Flemish printmaking. Her projects include volumes on the De Gheyn family (2000), Philips Galle (2001), the Wierix family (2003–04), the Collaert Dynasty (2005–06), Johannes Stradanus (2008) and Hendrick Goltzius (2012). Her current research on four generations of the De Jode family of Antwerp will be published in 2016.

Linda Stiber Morenus

Linda Stiber Morenus is a PhD candidate with the Staatliche Akademie Der Bildenden Künste, Stuttgart, Germany. Her dissertation is titled 'Chiaroscuro Woodcut Printing In 16th-17th Century Italy: Technique in Relation to Artistic Style'. She holds an MA and a CAS from the State University of New York, College at Buffalo, Art Conservation

Program. Currently a conservator in private practice, she previously was a Senior Paper Conservator with the Library of Congress and also held Paper Conservator positions with the Smithsonian Institution's National Portrait Gallery and U.S. National Archives. She has been awarded a Library of Congress Kluge Fellowship, James H. Billington Award, and Kittredge Foundation Grants for scholarship. She has published articles on the woodcuts of Albrecht Dürer, the historic display and storage of monumental prints, Japanese woodblock prints, Joseph Pennell's artistic transfer lithography and, with Katherine Blood, Pennell's pastels and charcoals – creating a chronology for hundreds of previously undated drawings. She has contributed to the University of Glasgow's 'Whistler Etchings Project' with research on the artist's printing papers.

Jun Nakamura

Jun Nakamura is pursuing a PhD in the History of Art at the University of Michigan, and he is also a practising printmaker with an emphasis on historical materials and processes. His MA thesis, 'A Private Practice: Hercules Segers and the Market for Prints' (Southern Methodist University, Dallas, Texas, 2013), looked at the potential market – or lack thereof – for Segers' prints and the implications of their 'limited' circulation. He was the Joseph F. McCrindle Foundation Curatorial Intern in Prints and Drawings at the National Gallery of Art for 2013–2014. He works on the Dutch Golden Age and all things printmaking. More specifically, his interests include Dutch transoceanic trade and travel, approaches to the depiction of space and early modern collecting practices and technology.

Doris Oltrogge

Doris Oltrogge studied Art History and Archaeology at the universities of Göttingen and Bonn, with a PhD thesis entitled 'Die Illustrationszyklen der *Histoire ancienne jusqu'à César*' (1987). She has been a researcher at the Forschungsstelle für Technik mittelalterlicher Buchmalerei, Göttingen University, and a researcher for art technological sources and techniques of book illumination at the Cologne Institute for Conservation Sciences (Fachhochschule Köln) since 1992. She curates an online database for art technological sources of the Middle Ages and Renaissance, <http://db.re.fh-koeln.de:2200/start.fau?prj=ifaust>. Among her recent publications are *Der 'Liber illuministarum' aus Kloster Tegernsee* with Anna Bartl, Christoph Krekel and Manfred Lautenschlager (2005); *Die Maltechnik des Codex Aureus aus Echternach: ein Meisterwerk im Wandel* with Robert Fuchs (2008); *Byzantinische Tinten-, Tuschen- und Farbrezepte* with Peter Schreiner (2011); and 'Transmission of Artists' Knowledge

in Germany (15th–17th Centuries)’ in *Transmission of Artists’ Knowledge*, eds. Mark Clarke, Bert De Munck and Sven Dupré (2012).

Peter Parshall

Peter Parshall, formerly Professor of Art History and Humanities at Reed College and Curator of Old Master Prints at the National Gallery of Art, has written and lectured widely on Renaissance art with special emphasis on the history of prints, the history and organization of collecting, and Renaissance art theory. He co-authored with David Landau *The Renaissance Print* (1994), recipient of the 1995 Mitchell Prize. Among the exhibitions curated are: *The Unfinished Print* (2001); *Origins of European Printmaking* (2005) with Rainer Schoch; and *The Darker Side of Light: Arts of Privacy, 1850–1900* (2008). His current projects include studies of Albrecht Dürer’s *Melencolia I* and the implication of the Lisbon earthquake of 1755 for the aesthetics of the Enlightenment.

Beth A. Price

Beth A. Price is the Senior Scientist in the Scientific Research Laboratory at the Philadelphia Museum of Art (PMA), Philadelphia, Pennsylvania. She received degrees in Art History, Chemistry and Liberal Studies from The State University of New York and Rutgers University. Prior to coming to the museum in 1990, she was a chemist at FMC Corporation, Research & Development Center, Princeton, New Jersey, and at the New York Botanical Garden Cary Arboretum, Millbrook, New York. Beth is a co-founder and Board member of the Infrared and Raman Users Group, which disseminates spectroscopic reference data to the international museum community. Her publications include: ‘Evolution of the Landscape: The Materials and Methods of the *Étant donnés* Backdrop’ in *Marcel Duchamp: Étant donnés*, ed. Michael R. Taylor (2009); ‘Handmade: A Scientific Study of James Castle’s Art’ in *James Castle: A Retrospective* (2008); and an essay in, *Looking at Atget* (2005). She co-curated the exhibition *Conserving a Tibetan Altar*, PMA (2007).

Marrigje Rikken

Marrigje Rikken specializes in Netherlandish drawings, prints and paintings of the sixteenth and seventeenth centuries. She was Assistant Curator of Seventeenth-century Dutch Paintings at the Rijksmuseum, Amsterdam, from 2006 until 2008. Since 2009 she has lectured at the University of Amsterdam on early modern art history. She is currently finalising her PhD thesis at Leyden University, in which she analyses the development of Southern Netherlandish animal imagery as an independent genre in

art, 1550–1650, and its relation to natural historical developments, networks of artists and elite collecting practices. She has published on a wide range of topics, including the article ‘Vroege kleurendruk in Amsterdam, een onbekend zeventiende-eeuws plaatwerk van Carel Allard’, in *De Boekenwereld* (2008).

Kathryn M. Rudy

Kathryn M. Rudy is Senior Lecturer in Art History at the University of St Andrews. She has written extensively about Northern European manuscripts and their functions. Her books and articles treat real and virtual pilgrimages, the word as image, and proverbs in medieval marginalia. Her current projects address the relationships between images, rubrics, and indulgences; manuscripts with objects, including prints, stuck into them; and manuscripts made in layers over time. Her books include *Virtual Pilgrimages in the Convent: Imagining Jerusalem in the Late Middle Ages* (2011) and a book about medieval paintings on parchment that functioned outside books (forthcoming from Yale University Press). She is co-editor of *Weaving, Veiling, and Dressing: Textiles and their Metaphors in the Late Middle Ages* with Barbara Baert (2007). She was elected to the Maatschappij der Nederlandse Letterkunde in 2009 and to the Centre Européen d’Études Bourguignonnes (XIV^e–XVI^e siècle) in 2011.

Ken Sutherland

Ken Sutherland is the Conservation Scientist in the Department of Conservation at the Art Institute of Chicago, Chicago, Illinois. Ken received his Chemistry PhD from the University of Amsterdam, conservation of easel paintings diploma from the Courtauld Institute of Art and biochemistry degree from University College London. Prior to coming to the AIC, Ken was a conservation scientist at the Philadelphia Museum of Art and a research fellow in the Scientific Research Department, National Gallery of Art, Washington, DC. Ken is a founding member of the Users’ Group for Mass Spectrometry and Chromatography and an editor for *Studies in Conservation*. Ken’s current research interests include shellac use in picture varnishes. His publications include ‘The Heads of Christ: A Technical Survey’ in *Rembrandt and the Face of Jesus* (2011) and ‘Technique and Pontormo’s Portrait of Alessandro de’ Medici’ in *Pontormo, Bronzino, and the Medici: The Transformation of the Renaissance Portrait in Florence* (2004).

Naoko Takahatake

Naoko Takahatake is Associate Curator of Prints and Drawings at the Los Angeles County Museum of Art.

Previously, she was an Andrew W. Mellon Curatorial Fellow in the Department of Old Master Prints at the National Gallery of Art and a Research Associate at the Center for Advanced Study in the Visual Arts. She received her D.Phil. in Art History from the University of Oxford. She has written and lectured on Renaissance and Baroque Italian prints, including articles on Ugo da Carpi, Agostino Carracci, Niccolò Vicentino and Bartolomeo Coriolano. Her current projects include an exhibition on the chiaroscuro woodcut in Renaissance Italy and a critical translation and study of Carlo Cesare Malvasia's 'Life of Marcantonio' in the *Felsina Pittrice* of 1678.

Simon Turner

Simon Turner is presently compiling a comprehensive catalogue of prints after Rubens for the New Hollstein series of Dutch and Flemish prints before 1700, with Jaco Rutgers. He will be editing the forthcoming New Hollstein volumes on Johannes Teyler. He regularly publishes in *Print Quarterly* and *Master Drawings*. His research interests include maps, monumental brasses and tapestries.

Andreas Uhr

Andreas Uhr studied Art History and Modern History at Dresden University of Technology (TUD) from 2000 until 2007, and he worked there in 2003 and 2004 as a research student at the European Graduate School in Gradiertenkolleg 625 'Institutional Orders, Script and Symbols'. In 2008 he received a research grant from the cities of Salzburg and Dresden in cooperation with the Institute of Art History and Musicology, TUD. Since 2009

he has pursued a PhD on printing techniques and the use of prints in the fifteenth century at the Justus Liebig University, Giessen, where he is also a member of the International Graduate Centre for the Study of Culture. From 2010 to 2013, he held a scholarship in the Graduiertenkolleg 891, 'Transnational Media Events from Early Modern Times to the Present', funded by the Deutsche Forschungsgemeinschaft. He has published several papers and reviews in his field of research.

Edward Wouk

Edward H. Wouk studied Art History and English, and, in 2010, received his doctorate from Harvard University with a thesis on the Flemish painter, draftsman and etcher Frans Floris de Vriendt (1519/20-1570). He is currently assistant professor at the University of Manchester. His previous publications include *The New Hollstein Dutch and Flemish Etchings, Engravings and Woodcuts, 1450-1650: Frans Floris de Vriendt*, which was awarded the 2012 Wolfgang-Ratjen Preis for outstanding research in the graphic arts. In collaboration with Suzanne Karr Schmidt he is currently editing a volume of essays entitled *Objectifying Prints: Hybrid Media 1470-1680*. He regularly incorporates Manchester-area collections into his teaching. His 2014 research seminar, 'Renaissance Print Cultures', resulted in the exhibition *Imprinting the Imagination: Northern Renaissance Prints from the Holtorp Collection* at the John Rylands Library, Manchester. His research interests include the emergence of artistic theory in northern Europe and the work of Marcantonio Raimondi.

Introduction: A Historical Overview of Printed Colour before 1700

Ad Stijnman and Elizabeth Savage

Although engraving and colour-printing never really met successfully until the stipple joined them, the dream of such a happy union was the mirage in the sandy desert of the years between the Renaissance and the eighteenth century¹

JULIA FRANKAU, 1900

Many histories of colour printing in the West cover the period 1500–1800, spanning the first ‘fine art’ colour print to the mechanisation of the press during the Industrial Revolution, or begin shortly after 1700, when a confluence of factors enabled the invention of the approach we still use today. Suddenly, all colours could be reproduced from three successive impressions (of blue, red and yellow, printed in that order, later preceded by black or extra blue). This approach developed into our CMYK (cyan-magenta-yellow-key [for ‘black’]), following the same order of printing. But that was not the invention of colour printing, just the first natural break in its already centuries-long history.

If earlier production is considered, it is often as a number of unrelated experiments rather than as a subject in its own right. Typically, histories of colour printing touch on three or four early moments. Some begin with late medieval book illustrations from the Augsburg printshop of Erhard Ratdolt, c.1480–c.1500. Many leap from the first German colour woodcuts, 1507–12, to Italian chiaroscuro woodcuts, 1516–c.1600, and finally to Netherlandish chiaroscuro woodcuts, 1555–c.1600, before arriving at the main topic of eighteenth-century colour printing. But colour printing is attested in far more areas, in more techniques for much longer than these episodes suggest.

It also began much earlier. For images, the accepted starting point was the 1480s, but that has recently been pushed back to the 1470s.² If initials are included, it is well known that multiples were produced in colour mechanically (i.e. with a press) in the Mainz Psalter of 1457, the second book ever printed. If text is considered, the first formes printed in red and black were folios of some early

copies of the Gutenberg Bible (c.1452–55). The first known instructions for manually producing multiples in colour (such as stamping woodblocks on fabric in colour inks) predate the printing press by half a century.

Recent advances in the digital humanities have facilitated access to colour-printed primary material on an unprecedented scale, as has the ability to reproduce prints in accurate colours in the secondary literature. Much new information has been brought to light through emerging interdisciplinary interests, as have many colour prints (including single-sheets, book illustrations and ephemera that had been described without reference to their colour printing) and additional colour impressions of previously known colour prints, sometimes in otherwise unattested palettes or inks. New material demands novel methods, and this volume breaks with previous scholarship by focussing not on the resulting artistic *style* of colour prints but on the underlying *techniques* that enabled those styles to develop. It is the first study to cover colour printing from the first of these technical approaches c.1400 until their total transformation c.1700 across Europe.

These prints’ production revises our understanding of the early history of printmaking in three main ways. Firstly, colour prints were greatly more common than has been realised (although they account for only a fraction of the total number of impressions, which were otherwise black-on-white). Secondly, the development of colour printing techniques was not the result of a progression of visionary advancements by a small number of individuals but nearly coeval with the introduction of the printing press in many areas. They were not necessarily disseminated; especially in the early years, when a number of printers in far-flung areas starting using similar (and relatively simple) approaches around the same time, printers could have developed them on their own or seen an example and realised how to approximate or achieve the same effect. Printers had access to the same tools, materials and techniques, so it is not surprising that they developed similar ways to achieve distinctive products for similar mar-

1 J. Frankau, *Eighteenth Century Colour Prints: An Essay on Certain Stipple Engravers and Their Work in Colour* (London, New York: MacMillan, 1900), 1.

2 A. Stijnman and E. Upper (now Savage), ‘Color Prints before Erhard Ratdolt: Engraved Paper Instruments in Lazarus Beham’s *Buch von der Astronomie* (Cologne: Nicolaus Götz, c.1476)’, *Gutenberg Jahrbuch* 89 (2014), 86–105.

kets. And thirdly, rather than a narrative of stop-and-go advancement, the early history of colour printmaking is characterised by a steady stream of dead-end experiments, independent reinventions of forgotten innovations and *ad hoc* technical variants. Some working manners became standard quickly, others only after having been autonomously invented again by another (later) printer. Some combined standard manners with idiosyncratic practices, and others were so idiosyncratic that they seem to have been used only once or in only one printshop.

This volume brings together the first fruits of this new research in several fields, including art history, book history/bibliography, conservation science, art technological source research and practical printmaking. Rather than moving from late fifteenth-century German book illustrations to sixteenth-century German, Italian and finally Netherlandish colour woodcuts, it begins with the earliest known recipes for reproducing images in colour (stamping or block printing; then called '*drucken*', German: lit.: 'printing') and ends with the discovery of what would eventually become our CMYK. It incorporates single-sheet prints, book illustrations and prints made for other functions, such as the decorative arts, from across Europe. It makes clear that the understanding of early colour printmaking requires a new paradigm for research into the history of graphic art, one that incorporates colour.

Historiography

Researchers of early colour prints have only recently been able to access a critical mass of primary material. Due to the privileging of 'pristine' (or 'unfinished'), black-on-white impressions over hand-coloured impressions, there remains no standard way to document either colour in general (printed or painted) or colour printing techniques in catalogue records. It is no coincidence that the bulk of published research concerns the few categories for which a standard cataloguing language exists, such as sixteenth-century Italian chiaroscuro woodcut, and that they were considered the only episodes of early colour printmaking. Before digitisation transformed research methods, scholars could not identify colour prints in collections without sifting through endless numbers of boxes and albums of prints in person. Their apparent absence reinforced the understanding that few were produced and thus that no cataloguing protocols needed to be developed. Given the overall rarity of impressions printed in colour, examples outside the familiar episodes of production were usually taken as curiosities.

The literature on the early history of colour printing is shaped by an artificial distinction between fine art and book illustrations. The academic division of early modern printed material into art in print collections and books in

libraries means that single-sheet prints are generally discussed in art historical literature; book illustrations and broadsides printed in colour are usually discussed in bibliographical studies (often without reference to their colour printing); and studies of prints outside of these categories largely remain to be undertaken. Sylvester Rosa Koehler, the first print curator at the Boston Museum of Fine Arts, sought to bridge this gap at the turn of the twentieth century, but his plans for an expansive exhibition and catalogue were left unfinished at his death in 1900.³ A notable, if unjustly overlooked, exception is Robert Burch's 1910 survey of colour prints in both books and single-sheets from the middle ages through the nineteenth century.⁴ Although it was published over a century ago, nearly all of his observations about the state of research remain valid. He contributed greatly to the first wave of interest in the history of colour printing, which developed in the late nineteenth century but soon waned.

The literature is characterised by a number of shorter studies of single prints, producers or case studies, rather than larger-scale studies that tie them together or connect printing techniques across all categories of printed matter. It is relevant that these exhibitions and publications have often necessarily been drawn from individual collections, as few modern collectors have specialised in colour prints before 1700. Even those who focused on more popular aspects of the history of colour printing, such as eighteenth-century French decorative prints, 'had to endure the taunts and jeers of most of the dealers', as William Vaughan complained in 1900.⁵ The more notable (or thicker-skinned) include Pierre Crozat in Paris and Antonio Maria Zanetti in Venice in the eighteenth century; Laura Kingsmill Marrs, née Norcross, in Boston in the nineteenth century (who collected under Koehler's careful guidance); Horace M. Swope in St. Louis and Allyn C. Poole in Cincinnati in the early twentieth century; W.G. Russell Allen and James B. Ayer in Boston and Frits Lugt in Paris in the mid-twentieth century; and Colin and Charlotte Franklin in Oxford⁶ and Norman

3 His notes and manuscript are held in the S.R. Koehler Archive, Worcester Art Museum (Massachusetts). See Timothy A. Riggs, 'Mr. Koehler and Mrs. Marrs: The Formation of the Mrs. Kingsmill Marrs Collection', *Worcester Art Museum Journal* 1 (1977–78).

4 R. Burch, *Colour Printing and Colour Printers* (London: Sir Isaac Pitman and Sons, 1910; rpt. Edinburgh: Harris Publishing in association with Hilger, 1983).

5 W.E. Vaughan, *Autobiographica: With a Gossip on the Art of Printing in Colours* (Brighton: Privately printed, 1900), 5.

6 *A Catalogue of Early Colour Printing from Chiaroscuro to Aquatint*, ed. C. Franklin and C. Franklin (Home Farm, Culham, Oxford: The authors, 1977).

Waddleton, who amassed the world's largest collection of book illustrations printed in colour before 1895, in the late twentieth century.

The episodic nature of enquiry in the secondary literature echoes the understanding of the apparently halting spread of colour printmaking that those texts advanced. From the first published reference on early colour prints in 1811 (Adam von Bartsch dedicated the twelfth volume of his series *Le Peintre-graveur* to Italian chiaroscuro woodcuts)⁷ until the first small wave of scholarship in the early twentieth century, the literature was almost exclusively dedicated to sixteenth-century Italian chiaroscuro woodcuts. The secondary area of interest was eighteenth-century intaglio colour printing, and the third and most minor was late medieval material, namely book illustrations printed by Erhard Ratdolt. The first survey with an international scope was also the first with colour reproductions: Anton Reichel's overview of colour woodcuts 1500–1800 drawn from the collection of the Albertina, which was published in German in 1926 and in English without the introductory essay in 1939.⁸ Until the early 2000s, it was the only international overview (at least, of all three usual lands). Its full-colour facsimiles, which were themselves printed with a revolutionary colour-printing technique (colour collotype), made it the only full-colour visual reference on the topic.

Several book-length studies exploring individual producers were published in the 1960s, as was the first exhibition in France on the history of colour prints before 1800 (which was based on the collection of Frits Lugt).⁹ In the early 1970s, two area-specific surveys made available a number of images of early modern Italian (based on Bartsch's list from 1811), German and Netherlandish colour woodcuts, but neither had colour reproductions nor the colours of known impressions.¹⁰

When it became feasible to publish scholarly volumes in full colour in the 1990s, a number of significant works appeared. They include Nancy Bialler's study of colour woodcuts in the sixteenth-century Netherlands and the sections on colour printing in David Landau and Peter Parshall's *The Renaissance Print*, both of which have informed many of the contributions to this volume.¹¹

Interest in the hand-colouring of prints increased rapidly after Susan Dackerman's pioneering study, *Painted Prints*, in 2002.¹² The awareness of colour printing followed more slowly, even if the next two years saw two very different exhibitions covering the early centuries of colour woodcut in Braunschweig¹³ and Tokyo (the second on this topic drawn from the collection of Frits Lugt).¹⁴ The first publication since Burch to give an overview of colour printmaking from the late middle ages to the early nineteenth century, encompassing both books and art, was Ad Stijnman's exhibition catalogue *Lichtspiel und Farbenpracht* in 2011.¹⁵ In the following year, he offered an extended summary of colour in his survey of intaglio printmaking from the earliest examples to the present, *Engraving and Etching 1400–2000*.¹⁶ At the same time, Elizabeth Savage (formerly Upper) elucidated that the colour

Verlag, 1973)/*Chiaroscuro: The Clair-obscur Woodcuts by the German and Netherlandish Masters of the XVI and XVII Centuries* (London: Thames and Hudson, 1973).

7 A. von Bartsch, *Le peintre-graveur*, vol. 12: Les clairs-obscurs des maîtres italiens (Vienna: J.V. Degen, 1811).

8 A. Reichel, *Die Clair-obscur-schnitte des XVII., XVII. und XVIII. Jahrhunderts* (Zurich, Leipzig, Vienna: Almathea-Verlag, 1926); trans., without the introductory essay, as A. Reichel, *The Chiaroscurists of the XVI-XVII-XVIII Centuries* (Cambridge, England: W. Heffer & Sons Ltd, 1939).

9 C. van Hasselt, *Clairs-obscurs: gravures sur bois imprimées en couleurs de 1500 à 1800 provenant de collections hollandaises*, exh. cat. (Paris: Les presses artistiques, 1965).

10 *Italian Chiaroscuro Woodcuts* [Bartsch vol. XII]: Le peintre graveur illustré: *Illustrations to Adam Bartsch's Le peintre graveur*, vols. XII–XXI, ed. C. Karpinski (University Park, London: Pennsylvania State University Press, 1971); W. Strauss, *Clair-Obscur: Der Farbholzschnitt in Deutschland und den Niederlanden im 16. und 17. Jahrhunderts* (Nuremberg: H. Carl

11 N. Bialler, *Chiaroscuro Woodcuts: Hendrick Goltzius (1558–1617) and his Time*, exh. cat. (Amsterdam: Rijksmuseum; Ghent: Snoeck-Ducaju, 1992); D. Landau and P. Parshall, *The Renaissance Print 1470–1550* (London, New Haven: Yale University Press, 1994), esp. 150–54, 184–202. Others include N. Stogdon, *German and Netherlandish Woodcuts of the 15th and 16th Centuries*, sales cat. 8 (The Old Rectory: Stogdon, 1991); G. Bartrum, ed., *German Renaissance Prints, 1490–1550*, exh. cat. (London: British Museum Press, 1995), nos. 50–52, 54–56, 58–62, 132, 134–37, 164.

12 S. Dackerman, *Painted Prints: The Revelation of Color in Northern Renaissance and Baroque Engravings, Etchings and Woodcuts*, exh. cat. (Baltimore: The Baltimore Museum of Art; University Park: Pennsylvania State University Press, 2002).

13 C. Kemmer, *Von Cranach bis Baselitz: Meisterwerke des Clair-obscur-Holzschnitts*, exh. cat. (Braunschweig: Herzog Anton Ulrich-Museum, 2003).

14 E. Hinterding, *Chiaroscuro Woodcuts from the Frits Lugt Collection in Paris*, exh. cat., ed. S. Watanabe, exh. cat. (Tokyo: National Museum of Western Art; Western Art Foundation, 2005).

15 M. Grimm, C. Kleine-Tebbe, A. Stijnman, *Lichtspiel und Farbenpracht: Entwicklungen des Farbdrucks 1500–1800*, exh. cat. (Wiesbaden: Harassowitz, 2011).

16 A. Stijnman, *Engraving and Etching 1400–2000: Historical Developments of Manual Intaglio Printmaking Processes* (London: Archetype; Houten: Hes & De Graaf, 2012), esp. 45, 341–72.

printing of many hundreds of surviving book illustrations and ephemeral materials has rarely been recorded and that printers (of books and art), not designers (of art), were responsible for the development and dissemination of early colour printing techniques.¹⁷

The tide has now turned. The history of colour itself has become a fertile line of enquiry,¹⁸ and printed colour is an especially exciting area. As this volume was going to press, the first large-scale exhibition on single-sheet colour prints of the sixteenth century was opening (In Farbe! Clair-obscur-Holzschnitte der Renaissance, at the Albertina, Vienna, touring to the Royal Academy of Art, London, as Chiaroscuro Woodcuts: Masterpieces of Renaissance Printmaking),¹⁹ and the first major study of chromolithography was published.²⁰ Around the same time, smaller projects introduced colour printing in Renaissance France²¹ and England.²²

A number of topical exhibitions and publications have been announced for the next five years. As an awareness of early colour printmaking grows, digitisation projects expand and cataloguing standards for recording printed colour develop, the history and the historiography of printed colour in the West will quickly be transformed.

Contents of the Volume

Many studies in this volume are much in debt to David Landau and Peter Parshall's investigation of the beginnings of colour printing in Germany and Italy in *The Renaissance Print* of 1994.²³ In the FOREWORD, *Peter Parshall* continues this discussion by critically assessing the state of research and cautioning that early colour-printed material must still be considered a rarity, even if it was far more common than previously believed.

The choice of whether or not to print in colour, i.e. making the colour a necessary and essential part of the conception of the image rather than a chance later addition by someone who was not the designer, has often been considered an artistic issue. However, the determining factors were mainly practical and financial. No matter how powerful the artistic vision, artists and designers could only create colour-printed images if they were able to collaborate with both a blockcutter who understood multi-block designs and a printer who could produce or source colour printing inks, use them to achieve various visual effects, and invest materials, time and even 'beer bonuses' for jobbing printers tasked with pulling impressions in two colours.²⁴ The materials, techniques and skills of all involved in production determined the visual information that the image could communicate, and a number of approaches were used to achieve a variety of ends. In SECTION I: AN INTRODUCTION TO COLOUR IN PRINTMAKING 1400–1700, *Elizabeth Savage* and *Ad Stijnman* provide an overview of the materials and techniques of colour printmaking until c.1710 and discuss parallel historical developments and terminological obstacles in relief and intaglio, respectively.

But colour printmaking began long before the printing press was invented by Johannes Gutenberg c.1452–55. SECTION 2: THE ADVENT OF COLOUR PRINTING, c.1400–1500, spans the diverse ways in which colour was incorporated into multiples in late medieval Europe. Challenging the perceived boundary between 'manuscript culture' and 'book culture', it encompasses forerunners of European colour printing, including woodblock-stamped textiles from the fourteenth century or perhaps earlier. The single-sheet woodcut on paper was introduced at the beginning of the fifteenth century, and all extant impressions were

17 E. Upper (now Savage), 'Printing Colour in the Age of Dürer: "Chiaroscuro" Woodcuts from the German-Speaking Lands, 1487–c.1600' (PhD diss., University of Cambridge, 2013).

18 Recent publications in this vein include, for instance, W. Jones, *German Colour Terms: A Study in their Historical Evolution from the Earliest Times to the Present* (Amsterdam: Benjamins, 2013); *Ibid.*, *Historisches Lexikon deutscher Farbbezeichnungen*, 5 vols. (Amsterdam: Benjamins, 2013); R. Osborne, *Books on Colour Since 1500: A History and Bibliography of Colour Literature* (Boca Raton: Universal-Publishers, 2013); R.G. Kuehni and Andreas Schwarz, *Color Ordered: A Survey of Color Systems from Antiquity to the Present* (Oxford: Oxford University Press, 2007).

19 A. Gnann, *In Farbe! Clair-obscur-Holzschnitte der Renaissance-Meisterwerke aus der Sammlung Georg Baselitz und der Albertina in Wien*, exh. cat. (Vienna: Albertina; Munich: Hirmer Verlag, 2013); A. Gnann and D. Ekserdjian, *Chiaroscuro Woodcuts: Masterpieces of Renaissance Printmaking*, exh. cat. (London: Royal Academy Publications, 2014).

20 M. Twyman, *A History of Chromolithography: Printed Colour for All* (New Castle, Delaware, and London: Oak Knoll Press and The British Library, 2013).

21 C. Jenkins, 'The Chiaroscuro Woodcuts of the Master ND at Fontainebleau', *Print Quarterly* 30.2 (June 2013), 131–43.

22 E. Upper (now Savage), 'Tudor Colour Printing', *Cambridge University Library Exhibitions*, accessed 15 January 2014, <https://exhibitions.lib.cam.ac.uk/tudorcolour/>. This exhibition opened at Cambridge University Library in December 2013.

23 Landau and Parshall, *Renaissance Print*, 180–202.

24 In 1573, the city of Frankfurt required that pressmen receive a 'Titelbier' for printing title pages in red and black. See E. Savage, 'Colour Printing in Relief', this volume, 38. For the additional printing in red of title pages, see E. Savage, 'Colour Printing in Relief', this volume, 35, 37 and 'A Printer's Art', this volume, 95.

printed with black ink and occasionally painted with watercolour. The earliest known 'colour' print is an engraving in white ink on black prepared paper issued by Master ES c.1465–67 (see p. 42, Fig. 3.1, below),²⁵ which was produced about a decade after the introduction of colour in typography.

To understand how these early attempts were made, *Doris Oltrogge* compares the extant late fourteenth- to early sixteenth-century recipes for colour inks for printing, demonstrating that the terms '*drucken*', '*trucken*', '*prynten*' and '*setten*' (all German: 'to print') made no distinction between stamping a woodblock manually or printing it with a press. They were largely used for manually stamping fabric or leather with woodblocks (only several were for use on paper, and fewer still for typographic printing).

After typographic printing with colour inks was introduced in the 1450s, red printing gradually became standard for rubrics and some typographic elements, as well as bicolour (red and black) initials, printers' devices and musical scores. Incunable printers, notably including Erhard Ratdolt, developed approaches to printing images in multiple colours. *Mayumi Ikeda* identifies how practical limitations of blue ink restricted the earliest attempts to print pictorial elements in more than one colour.

But not all colour printing took place in a press. *Andreas Uhr* examines the incorporation of colour into pasteprints, which are little understood three-dimensional multiples that do not necessarily involve paste or printing (at least, with a press). *Kathryn M. Rudy* explores how Birgittines, in a hybrid manner and contrary to the usual working order, first stamped (in black) pages of parchment manuscripts with woodblock historiated initials and decorative borders, vividly painted by hand, before the text was written. Together, they explore how the application of colour was standardised in workshop practice before it was possible to mechanise it.

Research presented in SECTION 3: THE RENAISSANCE IN COLOUR, c.1476–1600 challenges the categories of 'medieval book illustration' vs. 'Renaissance fine art print.' By doing so, it revises the standard narrative of the dissemination of colour printing over the sixteenth century, which holds that unsophisticated late medieval book illustrations from the 1480s and 1490s were unrelated to the 'fine art' single-sheets that emerged in the German-speaking lands mainly 1507–c.1520, in Italy from 1516–c.1600 and then in the Netherlands in the latter 1500s.

Colour printing first took hold in the German-speaking lands. Members of Holy Roman Emperor Maximilian I's imperial court and his printmakers led a fertile period of discovery and experimentation, 1507–c.1520. Hans Burgk-

mair's invention (c.1508) of *cutting* highlights from a tone block instead of *printing* them with an extra block is often lauded as the 'invention' of colour printing, but it was a stylistic (not technical) advance from the colour woodcut book illustrations he may have designed for the printer Erhard Ratdolt in the 1490s. Maximilian I died in 1519, and the rate and quality of production plummeted. This new manner of colour printing was used by only a few designers and printers in courtly circles at first, and their output was limited and seems to have had no commercial intentions. However, it was quickly picked up by the market. *Elizabeth Savage* provides an overview of the production and artistic influence of colour prints in the German-speaking lands in the long sixteenth century. By focussing on the designer Hans Wechtlin, *Alice Klein* sheds new light on the first colour print collecting practices and the role of Johann Schott, now known almost exclusively as a book printer, in the dissemination of this new artistic technique.

The concept found fertile soil in Italy, first in Venice in the 1480s where so many German printers employed their skills. In 1516, the Venetian artist Ugo da Carpi claimed to have invented a way to print woodcuts imitating chiaroscuro drawings (wash drawings) (Fig. 1), after which the chiaroscuro woodcut soon spread in Italy. These prints could consist of several interdependent tone blocks, and etching was combined with woodcut tone for the first time in c.1530. Through the close scrutiny of ink hues and watermarks, *Naoko Takahatake* distinguishes between original impressions and later restrikes of works by Ugo and other Italian printmakers. *Linda Stiber Morenus* gives insight into the workshop practices of Italian sixteenth-century colour printers, and *Beth Price*, *Nancy Ash*, *Shelley Langdale*, *Haddon Dine*, *Ken Sutherland*, *Lucia Burgio* and *Jo-Fan Huang* trace a network of designers and printers through the technical examination of impressions. Chiaroscuro woodcuts have always been held in high esteem, and the overwhelming majority of research on early colour prints concerns them. The innovative approaches of these studies bring fresh insights, refining and renewing attributions of earlier and later impressions of even the best-known chiaroscuro woodcuts.

Both the concept of chiaroscuro woodcut and novel printmaking techniques, including the combination of an etched design with additional tone blocks, were introduced from Italy into other countries in the mid-sixteenth century. A small number were produced in France in the 1540s, possibly by one Italian printer, but many more were made in the Netherlands in the 1550s. *Edward Wouk* untangles the complex working relationships of those involved in the earliest production of colour prints in both of those methods in the Netherlands.

25 See A. Stijnman, 'Colour Printing in Intaglio', this volume, 42.

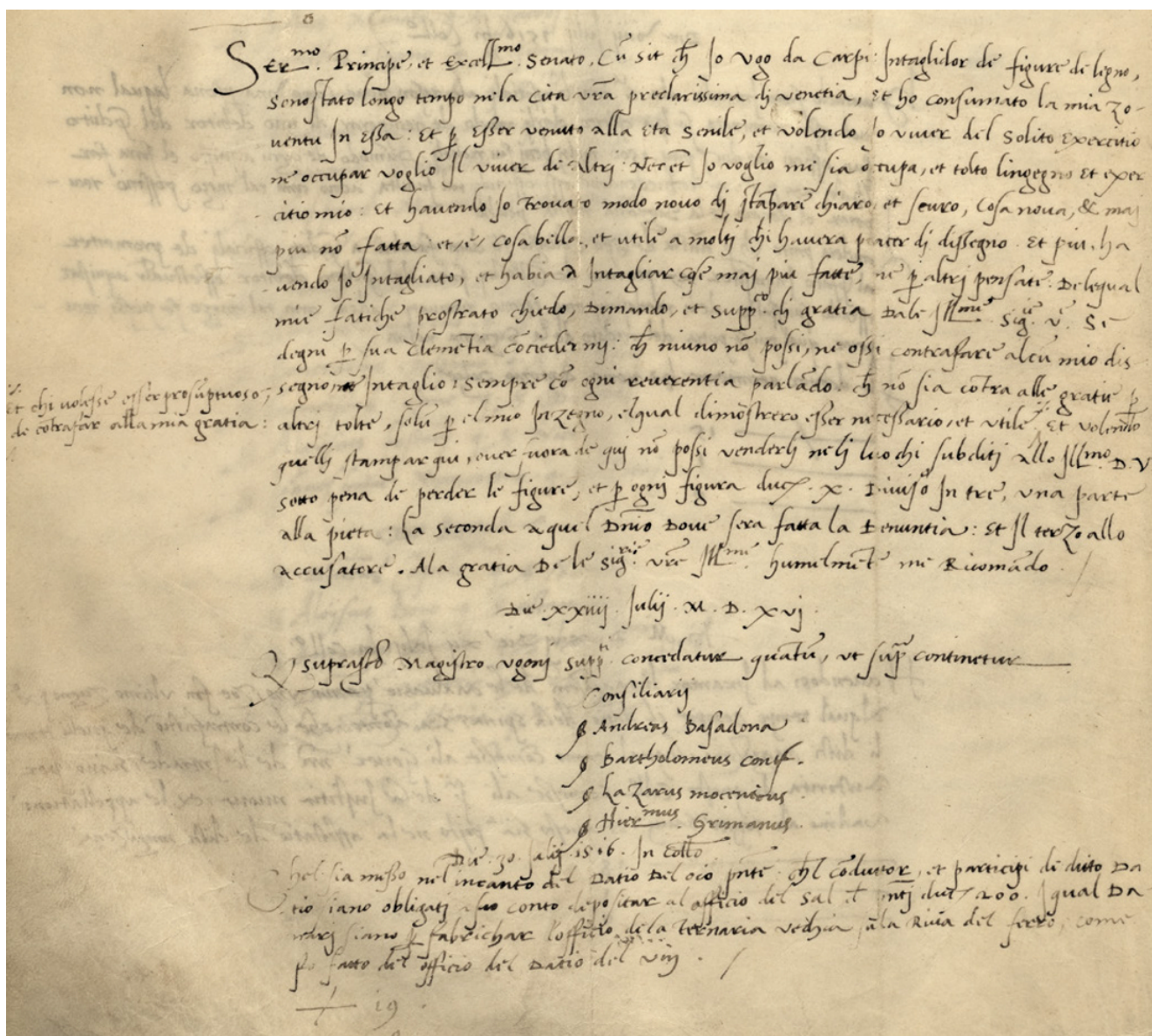


FIGURE 1 Ugo da Carpi, privilege application to the Senate of Venice for printing 'chiaro et scuro', 24 July 1516
VENICE, ARCHIVIO DI STATO, NOTATORIO DI COLLEGIO, REGISTRO 18, 7 MARCH 1515–27 AUGUST 1520, C. 39

SECTION 4: VIVID MANNERISM, c.1588–1650, explores how the next generations of colour printmakers refined, adapted and transformed both these techniques and individual prints to meet market demands. It also marks the general shift from woodcut to intaglio techniques that allowed for more detailed designs, as first exploited by the Dutch Mannerist artist Hendrick Goltzius in his influential Northern chiaroscuro prints. Marjolein Leesberg's close scrutiny of his inks identifies original issues and restrikes (sometimes with new tone blocks replacing older ones), further refining attributions and clarifying his workshop practices. The coincidence of the new market for colour prints and the Dürer Renaissance in the 1620s led an Amsterdam printer to transform Albrecht Dürer's

original, century-old, German woodcuts into new, seventeenth-century, Dutch colour prints by adding additional tone blocks, as Anja Grebe writes. France was slower to develop this market interest, but Alexander Dencher's investigation of colour woodcuts by Ludolph Buisinck after designs by Georges Lallemant reveals a French interest in the genre. The next innovation, he notes, was François Perrier's transferring of the concept of chiaroscuro to intaglio printmaking, by printing the white highlights from a separate plate instead of removing them from a tone block.

In the seventeenth century, intaglio techniques became dominant. SECTION 5: PRODUCT INNOVATION AND COMMERCIAL ENTERPRISE, c.1620–1700 explores how

printers strived to create uniquely expressive and/or commercially viable colour prints. *Jun Nakamura* discusses the reception of colour-printed etchings by the Dutch artist Hercules Segers in the early seventeenth century, exploring how they were transformed from dead-end experiments that attracted little interest from contemporaries to influencing generations of artist-printmakers. *Simon Turner* explores the production, function and receptions of the first dedicated intaglio colour printshop, financed by Johannes Teyler. Although his workshop produced many hundreds of colour prints, they seem not to have been intended for publication and found their way to the print market only after the workshop was closed and its complete inventory put up for auction. Commercially astute Amsterdam publishers soon copied Teyler's working manner, and *Marrigje Rikken* and *Elmer Kolfin* trace the series of colourful etchings that they issued from 1695 until colour printmaking was transformed just over a decade later.

This volume, like this period of early colour printmaking, ends around 1700. In the CONCLUSION: *PRINTING COLOUR AFTER 1700*, Ad Stijnman explores how Jacob Christoff Le Blon created the first method for printing images in accurate colours while he was working in Amsterdam, c.1705–10. He over-printed three mezzotint plates inked in transparent blue, yellow and red (in that order), and the particular superimposition of colours on white paper provided all the required hues. The concept of using varying percentages of the three primary colours to produce all hues is familiar today from photo editing software, but it was revolutionary in the eighteenth century. It coincided with a market for the exact replications of drawings and paintings and radically changed the nature of the colour print. It continues to shape colour printmaking today; desktop printers and photocopiers print in CMYK, which derives directly from Le Blon's unusual gift.

Purpose of the Volume

Together, these contributions herald a sea change in print scholarship. Although colour impressions represent only a small fraction of prints produced before c.1700, the known number is growing and already significant. Many printers experimented with colour printing, but that is not to say that colour printing was necessarily or merely experimental. Some printers specialised in it, and, if book illustrations are considered, thousands or even tens of

thousands of individual colour impressions may have been in circulation. The identification of many printers' repeated efforts, such as printing the same matrix or matrices in a spectrum of colours and commissioning original or replacement tone blocks for older matrices, suggest markets for printed colour existed throughout Europe before c.1700. Many more colour prints were produced than has been realised, some 'outliers' represent major trends, and producers and consumers of printed material in the early part of the handpress period indeed valued printed colour.

It is hoped that this volume will provide researchers with tools for exploring this new field. Some are basic, some more complex. The GLOSSARY is the first in English for terms relevant to early colour printmaking,²⁶ and the CHRONOLOGY is the first in any language to incorporate colour-printed book illustrations on equal terms with single-sheet prints and ephemeral material, and to encompass material produced across Europe, not just in the three main countries of production, and from 1400 to 1700.²⁷ It is also hoped that this volume will urge researchers to adopt an object-based interdisciplinary approach that incorporates art historical, art technological and bibliographical studies and that prioritises what is essential to the object (e.g., the printing technique) rather than what may be chance (including, in some cases, the selection of colours and the presence or range of tonal contrast).

Although colour impressions represent only a small fraction of prints produced before c.1700, the number is growing rapidly. The close scrutiny of known material and the identification of previously undiscovered colour prints, like the changing perspectives, fresh insights, technical examinations and improved understanding of historical documentation presented in this volume, have led to breakthroughs. Together, they point to a new paradigm in the study of the history of graphic art that, for the first time, incorporates printed colour.

26 See also N. Ash, S. Homolka and S. Lussier, *Descriptive Terminology for Works of Art on Paper: Guidelines for the Accurate and Consistent Description of the Materials and Techniques of Drawings, Prints, and Collages*, ed. R. Wolcott (Philadelphia: Philadelphia Museum of Art, 2014), <http://www.philamuseum.org/conservation/22.html>.

27 For a more general chronology on all forms of colour 'printing', from prehistory until 1910, see A. Stijnman, 'Chronologie van de kleurendruk', in R. Meijer, H.C.M. Schretlen and A. Stijnman, *Coloritto: De kunst van het kleurendrukken* (Amsterdam: Dr. P.A. Tiele-Stichting, Universiteitsbibliotheek Amsterdam, 2003), 32–56.

PART 1

An Introduction To Colour In Printmaking 1400–1700



Materials and Techniques for Early Colour Printing

Ad Stijnman and Elizabeth Savage

Since the 1970s, art historical studies have increasingly emphasised the technical examination of artworks and art technological source research (contemporary textual and visual information about the production of cultural objects). For historical printed matter, in contrast, physical characteristics have been considered as largely secondary to iconographic. Due to the limitations of photography and the high cost of colour printing, it was common until recently for reproductions of prints to depict the black-and-white, two-dimensional *design*, not the entire, full-colour, three-dimensional *object*. The contrast of photographs of prints in scholarly works was frequently enhanced so that the printed ink appeared flat black and the hue and texture of the (usually creamy white paper) support was bleached out. The nature of illustrations restricted the study of colour in prints, be it painted or printed, and the understanding of how the material characteristics of a printed object inform the visual effect of the artwork. The new material turn in print studies is particularly crucial to the study of colour prints because neither the individual objects nor their historical development can be understood without reference to the colour inks and colour-specific printing techniques with which they were created.

From rubrics printed in red ink from moveable type in Johannes Gutenberg's *Biblia latina* of c.1452–55, until Jacob Christoff Le Blon revolutionised colour printing with his tri-chromatic approach that we still use today c.1705–10,¹ a number of relief and intaglio techniques were used to print images in colour. Research has focused on individual case studies, which are sometimes still considered the only examples (not simply the best known); even major pan-European trends have not been recognised. This volume aims to fill many gaps by offering an overview of colour printmaking in Europe from the fifteenth century until the beginning of the eighteenth and by providing tools for research into practical and technical aspects of the production of colour prints.

This chapter outlines the approaches to printing colour that are attested in the surviving material, including text (i.e. formes set with moveable type), book illustrations

and single-sheet prints, which were produced in intaglio, relief and combination techniques. It concerns monochrome (non-black) or polychrome inked matrices printed in a press, not produced by manual methods such as rubbing or stamping (block printing). Because few contemporary terms are known, it uses modern and descriptive vocabulary. After introducing printing processes in general, it lays out the documented approaches to colour printing, summarises the characteristics of some colour inks and discusses the artistic contributions of printers, dealers and designers in the printing of colour. Especially in the early years of the press, there were simply printers, not book printers as distinct from art printers, and a printer would produce all kinds of printed material in the same workshop on the same press, whether it was common (for relief) or rolling (for intaglio). The consideration of approaches to printing colour in both text and images therefore emphasises that the development and spread of colour printing was led by *printers*, not *artists*. The separate historical development of these approaches in relief and intaglio techniques are summarised by Elizabeth Savage in Chapter 2: Colour Printing in Relief before c.1700: A Technical History (p. 23–41) and Ad Stijnman Chapter 3: Colour Printing in Intaglio before c.1700: A Technical History (p. 42–47).

General Printing Methods

The accepted narrative of the history of printmaking follows a (relatively) clear path of development from Johannes Gutenberg until the mechanisation of the trade in the nineteenth century. However, 'printing' began long before he produced the first book with moveable type on a printing press, the Gutenberg Bible, c.1452–55. Since at least the fourteenth century, fabrics had been 'printed'² (block-printed or stamped) with woodblocks that had been covered in oil-based inks (water-based inks would wash out). From c.1410–20, single-sheet impressions of woodcuts were made by laying a sheet of paper on an inked matrix and rubbing its back with a tool so that the

¹ See A. Stijnman, 'Colour Printing in Intaglio', this volume, 216. On the spelling of Le Blon's given names, see the Foreword, x, nt. 8.

² On contemporary terminology, see D. Oltrogge, 'Colour Stamping', this volume, 51.

ink transferred to its front, using black and usually water-based inks;³ and all other colours were added afterwards by brush.⁴ Other early forms of printing without a press are little known but include pasteprints (three-dimensional artefacts in which the design of a relief plate was transferred to a resinous paste on paper),⁵ and casts (made by pouring a liquid substance onto an inked printing plate and removing it after it hardened so that it would pull off the ink; sulphur casts are known from the mid-fifteenth century, and gelatine, plaster and wax casts from the sixteenth).⁶

Using a printing press, four distinct methods for transferring a design from an inked matrix onto a support were in common use before the nineteenth century:

1. In relief techniques (e.g., woodcut, wood-engraving,⁷ metalcut and letterpress), first printed in a press by Gutenberg c.1455, the surface is cut away so that the design is effectively *raised*. After the matrix is inked, the ink is transferred from its surface onto a support (usually paper) with a common printing press. Printing technologies are so conservative that this kind of press did not change significantly from Gutenberg until the Industrial Revolution, when the use of metal rather than wood for the frame allowed for more pressure, more precision and larger edition numbers per hour.⁸

2. Intaglio techniques (e.g., engraving, drypoint, mezzotint, etching and aquatint), which are known from the 1430s and were first printed in a press from the early 1460s, involve metal plates with the design *incised* into the surface. The plate is inked to fill the grooves, the surface is cleaned, and the matrix is printed by forcing the support into the grooves where it contacts the ink by means of a roller press. A roller press concentrates at least ten times as much pressure per square centimetre on the matrix than a common press, which is not powerful enough for intaglio printing.
3. Planographic printing (e.g., lithography), with the design flush with the surface, was invented by Alois Senefelder c.1798. Attempts at colour printing were tried in its early years, but success came only with the patenting of chromolithography in 1837.⁹
4. Several screenprinting techniques, which involve partially masking areas that are not to be printed and pressing ink through gaps in a stencil, developed simultaneously from 1850. (Stencils had been used to supplement printing processes in early modern Europe, for printing text and music notation, or to expedite the painting of an image after it had been printed.)¹⁰

Special forms of printing either in relief or intaglio (or both) include blind embossment (the moulding of the relief of an uninked matrix in paper),¹¹ and nature printing (making an impression of a natural object, such as a tree leaf, usually in relief but occasionally in intaglio or both).¹² This volume concerns only relief and intaglio techniques because they were in use for printing colour before c.1700.

3 P. Parshall and R. Schoch, *Die Anfänge der europäischen Druckgraphik: Holzschnitte des 15. Jahrhunderts und ihr Gebrauch*, exh. cat. (Washington: National Gallery of Art; Nuremberg: Germanisches Nationalmuseum, 2005), 21; on the black pigments, see A. Stijnman, 'The Colours of Black: Printing Inks for Blockbooks', *Bibliothek und Wissenschaft* 46 (2013).

4 On hand-colouring medieval prints, see S. Lepape and K.M. Rudy, *Les origines de l'estampe en Europe du Nord 1400–1470*, exh. cat. (Paris: Louvre éditions, 2013); D. Oltrogge, 'Illuminating the Print: The Use of Color in Fifteenth-century Prints and Book Illumination', in *The Woodcut in Fifteenth-Century Europe*, Center for Advanced Study in the Visual Arts Symposium Papers 52, ed. P.W. Parshall (Washington, D.C.: National Gallery of Art; New Haven, London: Yale University Press, 2009), 299–315.

5 See A. Uhr, 'Colour-Printed Pasteprints', this volume, 76–81.

6 A. Stijnman, *Engraving and Etching 1400–2000: A History of the Development of Manual Intaglio Printmaking Processes* (London: Archetype, 2012), 40–41, 328–31.

7 Wood-engraving, i.e. cutting end-grain woodblocks with a burin to print the blocks in relief, was developed by Thomas Bewick c.1775, following earlier forerunners. Colour printing in wood-engraving was not practised before the early nineteenth century.

8 J. Moran, *Printing Presses: History and Development from the Fifteenth Century to Modern Times*, 2nd ed. (Berkeley, University of California Press, 1978).

9 For a thorough assessment of colour in lithography, see M. Twyman, *A History of Chromolithography: Printed Colour for All* (New Castle, Delaware, and London: Oak Knoll Press and The British Library, 2013).

10 E.J. O'Meara, 'Notes on Stencilled Choir-books', *Gutenberg-Jahrbuch* 9 (1933), 169–185; T. Primeau, 'Coloring within the Lines: The Use of Stencil in Early Woodcuts', *Art in Print* 3.3 (2013), accessed 15 November 2013, http://artinprint.org/index.php/articles/article/coloring_within_the_lines_the_use_of_stencil_in_early_woodcuts.

11 A. Stijnman, *Hochzeit von Bild und Buch: Anfänge der Druckgraphik, 1420–1515*, exh. cat., Wolfenbütteler Hefte 26 (Wolfenbüttel: Herzog August Bibliothek; Wiesbaden: Harrassowitz, 2009), 21; Stijnman, *Engraving and Etching*, 321–22.

12 For the techniques of nature printing, see P.N. Heilmann, 'Das Verfahren des Naturselbstdruckes im Laufe der Jahrhunderte', *Aus dem Antiquariat: Börsenblatt für den Deutschen Buchhandel – Frankfurter Ausgabe* 12. 103/104 (1990), A 493–A 501; *Ibid.*, 'Die Technik des Naturselbstdruckes', *Mitteilungen Geologisch und Paläontologisch Landesmuseum Joanneum*, 55 (1997), 85–102. For an overview of nature printing until 1700, see R. Cave, *Impressions*

General Approaches to Colour Printing

In principle, four early modern approaches to colour printing in relief and/or intaglio printmaking are attested. In all, the printing seems to have been usually batched by colour, usually (but not always) from lightest to darkest.

1. In monochrome prints, from c.1452–55, one matrix (block, type, plate) is inked with one (non-black) colour and printed onto a support in one run. All other manners are polychrome.
2. Jigsaw prints (also called ‘compound prints’), from 1457, have several matrices that are inked separately, each in a different colour, and then fit together and printed onto a support in one run (Fig. 1.1). The impression shows clear divisions between the various colours, and the registration (alignment of the matrices) is identical and perfect in every impression.
3. *À la poupée* printing, attested from 1457 with relief printing¹³ but associated with intaglio from the 1690s, involves inking one matrix with multiple colours and printing it onto a support in one run. Impressions usually show adjacent colours on the same line or plane, or slight mixing at the edges of adjacent colours (Fig. 1.2).
4. From the early 1480s, images were printed in register. One impression each of several matrices, each inked in a different colour, are superimposed on a support. The impressions can overlap partly, completely or not at all, and the inks can be transparent (and thus combine to form new colour gradations) or opaque (Fig. 1.3).

VARIANT APPROACHES TO COLOUR PRINTING

Many variants of these four approaches are known. The earliest may be a composite print, for which three monochrome

prints in different colours were cut out and sewn together to make a single image, of c.1467.¹⁴

The most common may have been masking with the frisket sheet, which involves superimposing impressions of one matrix in register, each in a different colour. Bibliographers have long known that frisket sheets, a mask placed in the part of the book printing press known as the ‘frisket’ that holds the printed sheet in place and protects its margins from ink smudges, were customised in early modern printshops so that liturgical texts could be printed in red and black.¹⁵ Bicolour images printed in this way were first discussed in 2014, when it was demonstrated that they were commonly produced in England from the early sixteenth century, two centuries before colour printing is thought to have been introduced there¹⁶.

The frisket would be cut to allow only specific parts of a woodblock print in each colour. These multi-colour prints were thus printed in register, but from multiple impressions of (different areas of) a single matrix. In intaglio printing, masking involves placing a piece of paper on top of the part of the plate that should stay blank.

Some printers combined techniques by creating images from impressions of both relief and intaglio prints, typically a woodcut tone block overprinted with an etched or engraved keyplate in black, from two presses.¹⁷ Relief matrices can be set in a forme with type, so woodcut and metalcut blocks can easily be inked and printed together with typographic text. But combining intaglio and relief printing involves taking impressions in succession on the same support by means of two different techniques, in two kinds of presses, using two kinds of ink, with two sets of materials, equipment and expertise, with higher chances of printing the second run out of register.

of Nature: *A History of Nature Printing* (London: The British Library, Mark Batty Publisher, 2010), 20–30. Until the nineteenth century, nature printing was commonly carried out with black ink. Earlier references are scarce but for instance, Leonardo da Vinci described how to ink a sage leaf with white ink and print it on black prepared paper in his *Codex Atlanticus* (c.1503–05), fol. 72^v.a; L. Reti, ‘Leonardo da Vinci and the Graphic Arts: The Early Invention of Relief-Etching’, *The Burlington Magazine* 113.817 (1971), 188–95, esp. 192–94. See also Cave, *Impressions*, 24–25, 169. With special thanks to Dominic Olariu, who is currently researching an Italian manuscript with (presumably) colour printed nature prints of flowers and plants of c.1500.

13 E. Savage, ‘Proto-à la poupée Printing in Relief: An Initial “D” in the Rylands Mainz Psalter, 1457’, *Der gegenwärtige Stand der materiellen Aspekte in der Inkunabelforschung*, ed. Christoph Reske and Wolfgang Schmitz, *Wolfenbütteler Schriften zur Geschichte des Buchwesens* (Wiesbaden: Harrassowitz Verlag, forthcoming 2015).

14 A. Stijnman and E. Upper (now Savage), ‘Color Prints before Erhard Ratdolt: Engraved Paper Instruments in Lazarus Beham’s *Buch von der Astronomie* (Cologne: Nicolaus Götz, c.1476)’, *Gutenberg Jahrbuch* 89 (2014), 86–105.

15 For surviving frisket sheets, see E. Upper (now Savage), ‘The Earliest Artefacts of Colour Printing in the West: Red Frisket Sheets, c.1490–1630’, *Papers of the Bibliographical Society of America* 108, no. 4 (December 2014): 477–522 (supplement: BibSite, The Bibliographical Society of America, <http://www.bibsocamer.org/bibsite>); Ibid., ‘“Scrappy fragments”: Untangling Robert Steele’s Discovery of Early Modern Frisket Sheets (1903)’, *Printing History New Series* 17 (January 2016): forthcoming; Ibid., ‘New Evidence of Erhard Ratdolt’s Working Practices: The After-Life of Two Red Frisket-Sheets from the *Missale Constantiense* (1505)’, *Journal of the Printing Historical Society Spring* (2015): 1–17.

16 For the colour printing of woodcuts in this way, see E. Upper (now Savage), ‘Tudor Colour Printing: Masking with the Frisket Sheet’, Cambridge University Library Exhibitions, accessed 15 January 2014, <https://exhibitions.lib.cam.ac.uk/tudorcolour/case/masking-with-the-frisket-sheet>.

17 Stijnman, *Engraving and Etching*, 366–75.



FIGURE 1.1 *Hand-painting with water-based paints vs. relief printing with oil-based colour inks on parchment. Above: manuscript initial and text supplied by hand in red and black, using water-based paint and ink. Below: metalcut jigsaw initial printed in relief, with a brighter red body and lighter red surrounding decoration, and black type. In: Psalterium ([Mainz]: Johann Fust and Peter Schöffer, 14 August 1457), detail of fol. CXXIX^r*
MANCHESTER, THE JOHN RYLANDS LIBRARY, 9784; REPRODUCED BY COURTESY OF THE UNIVERSITY LIBRARIAN AND DIRECTOR, THE JOHN RYLANDS LIBRARY, UNIVERSITY OF MANCHESTER

The earliest known prints in this two-press style are Italian single-sheets, starting with *Saints Peter and John Healing the Lame Man* (B.XVI.9.7) by Parmigianino or his circle, c.1530.¹⁸ However, a unique impression of a German etching combined with a tone block dated 1538, a *Couple in a Landscape* previously attributed to Erhard Altdorfer, was

reproduced in the early twentieth century but now cannot be traced.¹⁹ It was also used in the Netherlands in the 1550s. Frans Floris used it for single-sheets c.1555,²⁰ but the most impressive example, if by sheer volume alone, is the 1557 publication on numismatics by Hubert Goltzius with (up to)

18 The first state has a greyish tone block and an etching overprinted in black for the lines of the design. The third state has two tone blocks for two yellowish brown hues. See N. Takahatake, 'Ugo da Carpi's *Diogenes*', this volume, 122.

19 W. Strauss, *Chiaroscuro: The Clair-Obscur Woodcuts by the German and Netherlandish Masters of the XVIth and XVIIth Centuries* (London: Thames and Hudson, 1973), 78, no. 40.

20 On Netherlandish examples, see E. Wouk, "'Divine, August and Immortal'", this volume, 151.



FIGURE 1.2 *Intaglio: in à la poupée printing, there can be minimal mixing where the edges of different colours touch. Detail of Abraham Blooteling, after Anthony van Dyck, Fece stat innocuus ... mala quanta manent [The Crowning with Thorns], 1660–90, engraving printed à la poupée, 19.0 × 14.2 cm (sheet)*
WOLFENBÜTTEL, HERZOG AUGUST BIBLIOTHEK, GRAPH. RES. C: 14

155 portraits from 148 designs each made from two woodcut tone blocks in yellowish-browns overprinted with an etching in black.²¹ Combined relief/intaglio colour prints were further developed with the application of roulette or mezzotint techniques, as used by Jan Thomas in the seventeenth century and Abraham Delfos, Elisha Kirkall, Arthur Pond, Vincent Le Sueur and Nicolas Le Sueur in the eighteenth.

Although a great many individual copies of books were illustrated by printing engravings or etchings within text after the last quarter of the fifteenth century, the working manner does not seem to have been documented until 1732.

Then, Dominique Fertel warned that book printers should leave enough white for the plate printer to print (intaglio) vignettes and headpieces easily.²² It indicates that the text was to be printed first and reinforces our argument that approaches to printing books and single-sheet artworks should be considered as two sides of the same coin.

OTHER ALTERNATIVES

Many other ways of incorporating colour into the production of a printed image are attested. Coloured supports were used (often paper, but also satin, silk, leather and parch-

21 H. Goltzius, *Vivae omnium fere imperatum imagines, a C. Iulio Caes. usque ad Carolum V. et Ferdinandum eius fratrem* (Antwerp: Copenius, 1557). The book was issued in Latin, German and Italian (1557), French (1559) and Spanish (1560); N. Bialler, *Chiaroscuro Woodcuts: Hendrick Goltzius (1558–1617) and his Time*, exh. cat. (Amsterdam: Rijksmuseum, 1992), 30–34. See E. Wouk, “Divine, August and Immortal”, this volume, 151.

22 D. Fertel, *La Science pratique de l'imprimerie* (Saint Omer: Fertel, 1723), 54–55: ‘Quand on veut mettre quelques “Vignettes”, “Fleurons”, ou “Armoiries” en taille douce dans l'impression d'un Livre, on doit observer de prendre leur juste grandeur, pour ne pas laisser moins de blanc, aux endroit où elles doivent être placées, qu'elles en contiendroient, afin que le Tailledoucier puisse imprimer ces Plances avec plus de facilité’.



FIGURE 1.3 *Relief: characteristic evenness of hue, intensity and topography of relief printing ink, with inks of three different viscosities. Detail of Domenico Beccafumi, St Philip, 1545–50, chiaroscuro woodcut from three blocks, 38.2 × 20.2 cm AMSTERDAM, RIJKSMUSEUM, RP-P-1966-495*

ment). Varnishes were printed so that metal leaf could be applied by hand to 'print' gold or silver leaf. Colours could be applied to a finished print by brush or by stamping or with stencils in a standardised way, usually with watercolour, as part of the production process to expedite the application of colour and ensure a (relatively) homogenous output.²³

Colour Inks

From the first description of inks for the production of multiples c.1400 (for stamping woodcuts on fabric) until the mechanisation of the press c.1830 after the Industrial Revolution, there is little information about the ingredients from which colour inks were made. Colour inks are rarely if ever described in known contemporary manuals, and the scientific analysis of early colour printing inks is in its infancy.

In general, oil-based printing inks were made by grinding a *colourant* (pigment or dyestuff) with a *vehicle* or *binding medium* (almost always an oil varnish, a partly polymerised vegetable – linseed or walnut – oil), sometimes with *additives* (such as driers, conditioners or extenders). Relief and intaglio printing inks are made from different ingredients, but almost all are oil-based; water-based inks (such as gum paste or gelatine dissolved in water and a

colourant, or iron-gall ink with additional gum arabic) were infrequently used for printing in a press, and only for woodcut, because water reticulates on metal.²⁴ Oil-based inks sit on the page (Fig. 1.4), as can paste-like water-based paints like gouache (Fig. 1.7), whereas water-colour washes, which were commonly used on prints because they did not conceal the printed lines, soak into it (Fig. 1.5). Black book printing ink (typographic ink) was almost always made with the pigment lamp black and an additive that expedited drying of the oil medium. For black intaglio ink, charred (carbon-rich) vegetable or animal pigment was ground into the oil varnish.²⁵ Metal inks were also used.²⁶

The earliest written documentation of colour inks for any kind of printing, manually stamping textile with woodblocks, is in a 1437 copy of Cennino d'Andrea Cennini's lost manuscript of the late fourteenth century.²⁷ It describes how to prepare oil-based inks for stamping on fabric from (probably) lamp black or vine black, blue from indigo, white from lead white, and red from red lead or vermillion. Other fifteenth-century authors provided similar

24 Water-based inks are found with fifteenth-century blockbooks and were used for popular imagery produced by *dominotiers*, a little researched group of itinerant printers active until the nineteenth century. They were not guild members and were legally forbidden the use of a printing press, or at least the kind of press used by typographic printers; J.-M. Garnier, *Histoire de l'imagerie populaire et des cartes à jouer à Chartres* (Chartres: Garnier, 1869), esp. 151; A. Stijnman, 'The Colours of Black: Printing Inks for Blockbooks', B. Wagner, ed., *Blockbücher des 15. Jahrhunderts, eine Experimentierphase im frühen Buchdruck: Beiträge der Fachtagung in der Bayerischen Staatsbibliothek München am 16. und 17. Februar 2012*, Bibliothek und Wissenschaft 46 (Wiesbaden: Harrassowitz, 2013), 59–80, esp. 66–69.

25 See Stijnman, *Engraving and Etching*, 258–80. On fifteenth-century printing inks see Stijnman, 'Colours of Black'.

26 For examples from 1508, see K. Nichols, 'Physical Qualities of Early Print', in *Altered and Adorned: Using Renaissance Prints in Daily Life*, ed. S. Karr Schmidt, exh. cat. (New Haven, London: The Art Institute of Chicago, Yale University Press, 2011), 99–100. See A. Grebe, 'Dürer in Chiaroscuro', this volume, 175–77. For an example from c.1519, see E. Savage, 'Jost de Negker's Woodcut Charles V (1519): An Undescribed Example of Gold Printing', *Art in Print* (July–August 2015), 9–15.

27 The earliest copies of the original of c.1400 are Florence, Biblioteca Mediceo-Laurenziana, ms. 23, p. 78 (dated 1437) and Florence, Biblioteca Riccardiana, ms 2190 (possibly sixteenth century). D.V. Thompson, *Cennino d'Andrea Cennini: The Craftsman's Handbook: The Italian Il libro dell'arte* (repr. of the ed. 1933. New York: Dover 1960), 20–23, 58–59, 117; see also Stijnman, 'The Colours of Black', 60–64. An important source for colour stamping on paper from the early fifteenth century was discovered as this volume was going to press, and it will be described in D. Oltrogge, 'Item wildu ein papir trucken mit span grún', *Zeitschrift für Kunsttechnologie und Konservierung* 29 (forthcoming 2015).



FIGURE 1.4 *Relief: red ink (from the 'tone' block) printed onto black ink (from the key block), both on top of, but not absorbed into, the paper support. Detail of Dirck de Bray, Sudarium of St Veronica, 1635–94, colour woodcut from two blocks, 19.6 × 14.4 cm AMSTERDAM, RIJKSMUSEUM, RP-P-1928-122*

recipes.²⁸ For colour printing inks intended for use in the press, such detailed information was not published for centuries. It seems that such inks were neither challenging to prepare and use nor prohibitively expensive, so it is surprising that colours besides black and red are so rarely found in early book and plate printing.

It is not yet known whether the pigments that were used in colour printing inks correspond to those recommended in the recipes because so few colour printing inks have been subject to technical examination. The exceptions are red inks that were more often used for printing

moveable type: from early on, both red typographic and intaglio inks were made from vermilion, either pure or mixed with red lead-oxide.²⁹ Some pigments can be identified visually with some degree of certainty: pale yellows, orange-browns and the like are presumably ochres, and pale blue-greys probably indigo or woad. Most pigments are presumably the same as were used for oil painting in the same area at the same time, simply because they were available and familiar.

The way in which colour inks change over time has as yet not been much researched. New visual effects resulting from discolouration have been misinterpreted as original, deliberate artistic decisions,³⁰ which can affect the modern classification of the print (i.e., as *chiaroscuro* or not),³¹ and faded colour inks have been recorded as 'grey' or 'pale black'.³² Darkened ink media (oil varnish) can also cause once bright colours to appear brown. For instance, trees or the heraldic tincture *vert* were probably once a vibrant green, not a muddy brown.³³

Several contributors to this volume present the first results of research into the contemporary documentation of recipes for colour printing inks and into the reconstruction and scientific analysis of historical colour printing inks.³⁴ As more such information becomes available, it may become possible to understand how early colour prints originally looked, trace how recipes were disseminated or independently created across places and times, identify impressions in apparently different palettes as being from the same inks and therefore from the same state (or vice versa), and pinpoint the date or place of production of anonymous prints.

Distinguishing Colour Printing from Hand-Colouring

It can be difficult to discern whether areas of colour are printed or painted, especially when certain colour inks or

²⁹ See D. Oltrogge, 'Colour Stamping', this volume, 58.

³⁰ See J. Nakamura, 'On Hercules Segers', this volume, 189–195.

³¹ See E. Savage, 'A Printer's Art', this volume, 23–24.

³² E.g. E. Upper (now Savage), 'Tudor Colour Printing: Intaglio Colour Printing', *Cambridge University Library Exhibitions*, accessed 15 January 2014, <https://exhibitions.lib.cam.ac.uk/tudorcolour/case/intaglio-colour-printing/>.

³³ See L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 123, and A. Grebe, 'Dürer in Chiaroscuro', this volume, 171, respectively. Technical examination may identify the pigments.

³⁴ On contemporary documentation see D. Oltrogge, 'Colour Stamping', this volume, 51; on reconstructions see M. Ikeda, 'The Fust and Schöffer Office', this volume, 65 and L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 123; on analysis see M. Ikeda, 'The Fust and Schöffer Office', this volume, 74 and B. Price *et al.*, 'A Technical Study', this volume, 140.

²⁸ D. Oltrogge, 'Colour Stamping', this volume, 51–64.



FIGURE 1.5 *Hand-painting: (a) washes of transparent watercolour and (b) layers of opaque bodycolour. Detail of Daniel in the Lion's Den, woodcut with hand-colouring. In: Historie von Joseph, Daniel, Judith und Esther (Bamberg: Albrecht Pfister, after 1 May 1462), fol. 19^r*

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methods of colour printing were used. For example, yellow relief printing inks from the 1490s tend to be so thin and transparent that great magnification can be required to determine whether areas of yellow are printed or painted. In mezzotint, the thickness of the ink layer and thus the hue of the ink may vary and give the appearance of painting, and areas can be over-printed in different colours to create composite hues (e.g., yellow over blue makes green) that blend in without any evident relief (Fig. 1.6). Nevertheless, it is usually possible to discern with unaided visual analysis whether areas of colour bear evidence of the pressure of the press and oil-based printing ink or the characteristics of freehand (or stencilled) water-based paint. Table 1.1 lays out some basic principles.

The Roles of Printers, Dealers and Designers

It must be remembered that colour printing was not always the intent of the designer. With book illustrations, it is usually evident that the colour printing of images was contemporary with the printing of the text in the same volume, but the dating of colour impressions of single-sheet prints is often less certain. For example, no colour

impressions of prints by Lucas van Leyden or Rembrandt van Rijn are known to have been printed under their supervision; all colour (monochromatic red) impressions of their copperplates seem to have been produced after they had died.

In several cases, later restrikes of older matrices³⁵ and/or the addition of new tone blocks or highlight plates created entirely new prints from new combinations of (old and new) blocks.³⁶ In impressions in which the key block designer could not have been involved (especially after he had died or after the blocks had been acquired by another printer), the printer rather than the artist must have determined whether a tone block would be printed, selected the colours, and, in some cases, commissioned a tone block from another designer or cutter. The repeated involvement of printers in the new addition of printed colour that were unnecessary for the legibility of the

35 See L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 123.

36 See A. Grebe, 'Dürer in Chiaroscuro', this volume, 171; M. Leesberg, 'Hendrick Goltzius's Chiaroscuro Woodcuts', this volume, 163; A. Dencher, 'The "Camaïeu" Print', this volume, 180.

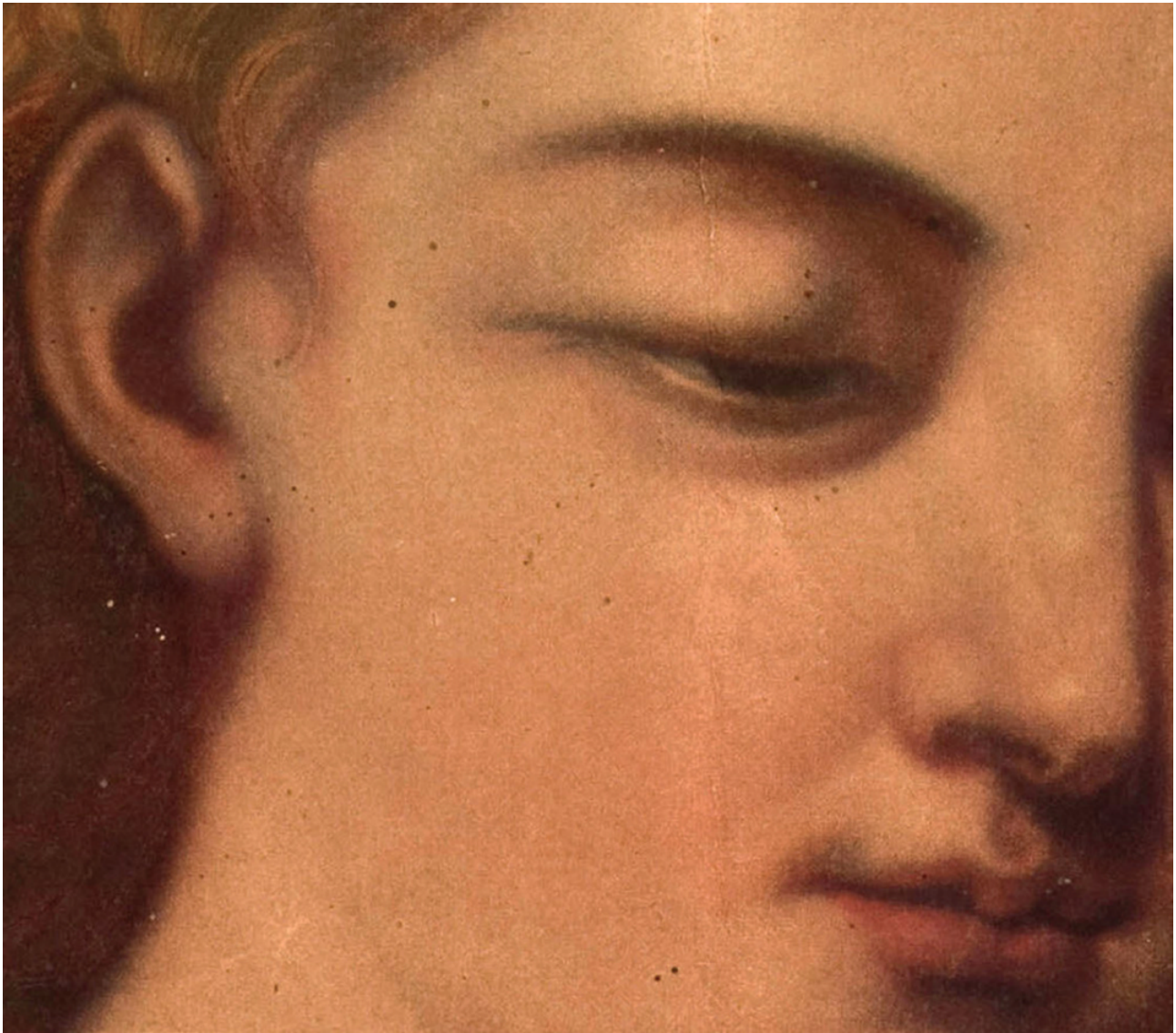


FIGURE 1.6 *Mezzotint: hazy, transparent superimposed layers of blue, yellow and red ink appear to the eye to merge, creating composite hues. Jakob Christoff Le Blon, after Antonio Allegri da Correggio, St Catherine, 1710–25, colour mezzotint, 44.3 × 32.2 cm*
BRAUNSCHWEIG, HERZOG ANTON ULRICH-MUSEUM, JCLEBLON V 2.408

image suggests that it made books and single-sheets more attractive to the market, at least for certain kinds of materials in certain places at certain times. It also complicates the authorship of the prints, as the artist or designer of the key block would not necessarily have approved, been involved with, or even been aware of a key aspect of the print's visual effect. In the future, the technical examination of ink and paper supports and the understanding of colour printing processes should allow for more certain dating of impressions, as should the mapping of the provenance of colour impressions.

The understanding of colour prints as artworks, each made by one artist or designer with primary responsibility for their creation, has shaped the understanding of the spread of colour printing. By the sixteenth century,

relief printing was so professionalised that the designer, block cutter and printer were different people with distinct roles and sometimes members of different guilds. Collaborations between designers and block cutters for normal woodcuts has been explored, but, for colour prints, it must be recognised that *printers* were of at least equal importance because their production would have been enabled only by their unusual specialist knowledge of how to prepare suitable colour inks and superimpose matrices. The involvement of the printer was especially significant in the spread of chiaroscuro printing in Italy from 1516. Even in collaborations between the printmaker Ugo da Carpi and artists whose works his prints reproduced (including Titian), the essential role of the printer – if not Ugo himself – is only now being explored.

TABLE 1.1 *Colour Printing vs. Hand-Colouring*³⁷

	Printed Colour	Painted Colour
Impression	<p>In relief, the pressure of the common press can leave a visible impression into the page and create a raised ridge ('squash') along the edges of the printed area (Fig. 1.1 b, Fig. 1.4. This can also have the effect of 'outlining' thin areas of printing (Fig. 1.7).).</p> <p>In intaglio, the ink sits on top of the surface of the support and the relief of the raised lines and dots can normally be observed under raking light.</p>	<p>Painted areas are not pressed into the support. However, watercolour may pool to the edges of the area of colour, giving a darker but not raised outline (Fig. 1.1: a).</p> <p>Especially opaque paints like bodycolour, the pressure applied to a heavily charged brush can cause raised edges similar to squash, but less fine and regular.</p>
Edges	<p>The outlines of the areas of printed colour are relatively sharp and smooth.</p> <p>In <i>à la poupée</i> printing, there can be minimal mixing where the edges of different colours touch.</p>	<p>The outlines of areas of painted colour are often blurred (Fig. 1.1a).</p>
Topography	<p>Printing ink sits on top of the support and on top of other opaque printing inks, so the topography of the layer of printing ink often conceals that of the support.</p> <p>In relief, dry inks may appear mottled, but the hue and intensity is consistent across the printed area (Fig. 1.3, 1.8). The surface of oil-based ink does not crack or become 'pockmarked'.</p>	<p>Watercolour is generally transparent and absorbed into the support, so the surface texture may seem to be that of the paper (Fig. 1.1a; 1.5a).</p> <p>Bodycolour can have a smooth surface and be so opaque that it can be used to censor printed text³⁸ (Fig. 1.5: b). Thicker layers may crack or flake over time or become 'pockmarked' during drying (Fig. 1.9).</p>
Application	<p>There are no brushstrokes. The application of colour across the image may be mis-registered due to the misalignment of blocks (Fig. 1.8).</p> <p>In relief, an irregular or insufficient ink film may result in streakiness.</p> <p>In intaglio, insufficient ink in the grooves may cause <i>manques</i> (white 'islands' within a printed line).</p>	<p>Brushstrokes may be visible in the topography of thicker paint layers or in traces of the brush handling (including smudges and smears, especially at the irregular edges of the areas of colour)</p>
Opacity	<p>In relief, the hue and intensity is uniform and printing inks are opaque to semi-opaque.</p> <p>In etchings and engravings, the opacity also depends on the volume of the grooves. The deeper the grooves, the more ink is transferred onto the paper, and the more opaque the resulting lines. So, engraved lines are usually darker than etched lines (Fig. 1.2).</p> <p>In mezzotint, the printed area is made of nearly flat areas of ink composed of many fine dots, with hazy edges to the areas of tone (Fig. 1.6). Areas can be over-printed to create composite hues: yellow ink over blue ink makes green.</p>	<p>In general, watercolour is transparent and bodycolour is opaque. The hue and intensity can vary throughout the painted area.</p>

37 For the purpose of this general overview, printing inks are described as oil-based and paints as water-based.

38 See, for instance, St Ambrose, *Omnia...opera*, ed. Desiderius Erasmus (Basel: Froben, 1538), Centre for Reformation and Renaissance Studies Library, Victoria University in the University of Toronto, BR65.A3 1538; illustrated in Owen Jarus, 'Censorship



FIGURE 1.7 *Black ink squash. Detail of Antonio da Trento, after Parmigianino, Man Seen from Behind, 1527–30, chiaroscuro woodcut from two blocks, 28.4 × 17.9 cm AMSTERDAM, RIJKSMUSEUM, RP-P-OB-31.137*

Because of the required level of professionalism, designers could not have produced colour woodcuts unless they were working with a capable printer (or publisher or patron) who could coordinate the production of printing inks from unusual or unique recipes and the superimposition of impressions of different matrices. Art historians have been unable to explain why so few *artists* each produced so few colour prints, but the question focuses on the wrong person. The history of colour printing is tied to colour *printers*, who tended to be prolific.

State, Variant, Version and Palette

All the above raise issues on the complexities of the colour print beyond the usual differentiation between

of 16th-Century Big Thinker Erasmus Revealed', *LiveScience*, published 15 May 2012, <http://www.livescience.com/20310-censorship-16th-century-erasmus.html>.



FIGURE 1.8 *Relief: black ink (from the key block) printed onto an area of extremely mottled red ink (from the tone block, from which highlights were cut to allow the paper to shine through). Detail of Lucas Cranach, John the Baptist, mid-sixteenth century, colour woodcut from two blocks, 34.1 × 23.9 cm AMSTERDAM, RIJKSMUSEUM, RP-P-OB-4477*



FIGURE 1.9 *Hand-painting: initial 'M' printed in relief in blue with red decoration, overpainted with a thick layer of opaque blue bodycolour that 'pock-marked'. In: Psalterium ([Mainz]: Johann Fust and Peter Schöffer, 14 August 1457), detail of fol. cv^r*

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states and copies of prints in black-and-white. What if part of an edition of a print is in black and another in blue or red? Or the printer of a set of blocks for a chiaroscuro print changed the ink palette, drastically altering the tonal contrast? How can those palettes be described? What if a publisher ordered the restrike of an original block, which had been printed only in black, in combination with a new tone block (or two)? How can we tell which colour inks have altered over time and how they have altered?

There is no historical vocabulary for these cases, and modern scholarship has largely described differences. Colour printmaking vocabulary is a complex field in which unspecified colloquial terms and cataloguing keywords abound and there is no standard for classification that could support the identification of colour prints in cataloguing systems. Because the present state of scholarship is concerned with gathering and identifying materials in order to be able to address issues related to their conservation, function, reception, style and techniques, that profoundly hampers research. These cases require research methods that are less straightforward than those traditionally used for black-on-white impressions. There is equally a need for standard terminology that applies the concept of the 'state' of a matrix to prints

with multiple matrices, each of which could be in different states and/or different colours.

As far as possible, the descriptive strategies adopted in this volume follow Naoko Takahatake's recent suggestions in *Print Quarterly*, which are being widely adopted.³⁹ 'State' refers to any deliberate alteration of any of the matrices used in a print, 'variant' to the changes that do not involve deliberate alterations to a matrix (e.g., using a different number of blocks) and 'version' to close copies from a new set of matrices. A combination of colour inks is called the 'palette'. One state can include many impressions, all in different palettes. The present volume uses the term 'book illustration' to refer to all pictorial elements in books, including frontispieces, title vignettes and borders and diagrams. It also uses the general term 'colour print' for all images printed in colour(s) other than black, reserving 'chiaroscuro' for those for which the term is historically accurate. Following the convention of calling hand-painted impressions 'coloured', it uses the term 'hand-coloured' for clarity.

39 N. Takahatake, 'Coriolano', *Print Quarterly* 27.2 (June 2010), 103–30, esp. 108.

Colour Printing in Relief before c.1700: A Technical History

Elizabeth Savage

The accepted history of relief colour printing in the hand-press period, especially c.1450–1700, is episodic, artist-focussed and divided between medieval books and renaissance or early modern art. Early woodcuts printed in colour are considered as rare, special things aimed at the elite end of the print market. So few artists were thought to have produced so few colour woodcuts that speculation has arisen about the difficulty or expense of production. However, it is becoming apparent that this extreme rarity reflects cataloguing standards that do not systematically include colour printing rather than the actual quantity of surviving colour impressions; although only a very small percentage of woodcuts may have been printed in colour, the number of known impressions is growing rapidly. It includes hundreds of book illustrations, few of which have been described as colour prints, from the fifteenth century and beyond. Now, the spread of colour printmaking techniques seems to be linked to printers, not artists/designers. From this, it follows that the production of colour woodcuts is not sporadic, in few areas, for a limited time, and for an elite audience of collectors, but relatively continuous across a large geographical area in products aimed at diverse markets.

Particularly but not exclusively in the German-speaking lands, much can be gained from considering single-sheets together with book illustrations.¹ Scholars have long been puzzled as to why designers would create just several colour woodcuts before giving up, but the question is flawed because they were issued by *printers* not *designers*. In some cases, single-sheets were only a small fraction of a printer's colour output, which was otherwise comprised of book illustrations. Crucial information about the production of single-sheets can be gleaned through the analysis of contemporary book illustrations from the same area.²

This brief survey of colour printing in relief spans the introduction of printing in relief in colour ink in the Gutenberg Bible c.1452–55 and Jacob Christoff Le Blon's invention of a method for printing accurate colours around 1710.³ Prints that combine relief and intaglio impressions are outside its scope, as are those printed in colour in variant techniques, such as masking with the frisket sheet.⁴ The division of the primary material into book illustrations and art is largely anachronistic; because they were created by the same teams using the same materials and techniques on the same equipment in the same printshops, this overview considers all kinds of colour-printed images and is organised primarily by technique. Although the workforce was highly international and mobile – Germans working abroad in Italy, France, Spain and England played crucial roles, as did Italians active in France – this study is subdivided geographically because the market for colour prints in each area followed its own course.

True, False, Real or Almost? Defining 'Chiaroscuro'

The term 'chiaroscuro' normally denotes the extreme contrasts of light and dark in painting, but, in graphic art, it can designate images printed in any colour.⁵ In its first application to printing, in Italian in 1516, it was used in reference to woodcuts that imitated Italian chiaroscuro drawing (see Takahatake, Fig. 10.1, p. 117). A distinction continued to be made between images printed in colour in general and images printed with carefully modulated tonal contrast even in Italian; Naoko Takahatake has pointed out the distinction between '*colore*' and '*chiaro et scuro*' in sixteenth-century documentation of colour prints.⁶ The first colour prints were instead described in terms of materials or techniques in German, and there

1 Colour-printed book illustrations in the early modern German-speaking lands, as well as and the materials and techniques with which they and other images were printed in colour, will be discussed in E. Savage, *Vivid Prints: Colour Printmaking and the Transformation of Visual Information in Early Modern Germany, 1476-ca. 1600* (in progress).

2 A. Klein, 'Hans Wechtlin', this volume, 103; R.M. Burch, *Colour Printing and Colour Printers* (London: Pitman, 1910; rpt. Edinburgh: Harris in association with Hilger, 1983), 29–30.

3 On the spelling of Le Blon's given names, see the Foreword, x, nt. 8.

4 See A. Stijnman and E. Savage, 'Materials and Techniques', this volume, 13.

5 R. Verbraeken, *Clair-obscur, – histoire d'un mot* (Nogent-le-Roi: Librairie des arts et métiers – éditions Jacques Laget, 1979), 70–75, 125, 147–49.

6 See N. Takahatake, 'Ugo da Carpi's *Diogenes*', this volume, 115.

seems to have been no term for relief colour printing for centuries after it was first practiced.⁷

The disconnect between the vocabulary used by the producers and later collectors of these prints grew into arbitrary and contradictory distinctions between categories such as 'precursors to chiaroscuro' (the incunabular printer Erhard Ratdolt's colour woodcuts and/or later simpler woodcuts); 'false/German chiaroscuro woodcuts' (variously, those that involve fewer than three blocks, with a black key block, without highlights cut from the tone block, in contrasting tones, and/or other categories); and 'true/Italian chiaroscuro' woodcuts at the top of the hierarchy. This has led to surreal explanations of why German colour woodcuts that meet various exacting criteria, such as having fewer than a minimum number of highlight lines cut from the block, are insufficiently chiaroscuro-esque to be considered a lowly 'German chiaroscuro' or even 'real colour printing'. For this reason, Ratdolt's colour woodcuts of the 1480s have been criticised for failing to achieve an aesthetic that emerged in Venice forty years later.

Especially in early- and mid-twentieth century literature, translations for 'chiaroscuro' ('*Helldunkel*', '*clair-obscur*'), 'colour print' (e.g. '*Farbendruck*'), variants ('coloured print' vs. 'colour-print') and collector's categories ('*camaïeu*', French: cameo; in graphic art, woodcuts printed in the related tones of carved cameo stones) have been considered synonyms, antonyms and subcategories of each other. For example, from the 1980s, a number of English-language texts have mis-translated '*camaïeu*' as its opposite: a colour woodcut in any colours with an independent black key block, also called 'German chiaroscuro' or 'false chiaroscuro'. Bafflingly, 'colour print' has also been used as a subcategory of itself; in oppositions like 'Far cry as it would seem from the chiaroscuro to the colour-print',⁸ it denotes either older material perceived as garish, cheap or tasteless or later material produced on a relatively mass scale (either in Le Blon's manner after c.1710 or chromolithography after the 1830s). Many variants of and exceptions to these schemes have been asserted as authoritative, creating stumbling blocks for research.

Previous Italo-centrism and emphases on primacy have also shaped investigations into early colour printing in relief. The tendency for chiaroscuro to be called a *technique* exaggerates the leap from Ratdolt's book illustra-

tions to the artist Hans Burgkmair's and then Ugo's single-sheets in the 1510s. From a printer's perspective, it is better understood as a *style* within the technique of printing in relief because removing areas of highlight from a tone block is a conceptual, not a technical, advance from printing solid areas of colour from a tone block. Designing interdependent blocks is more complex, but not all woodcuts printed from interdependent blocks involved tone blocks or imitated chiaroscuro drawing. Burgkmair, for instance, issued a two-colour woodcut and a three-colour woodcut with what could be called interdependent hatching blocks in the 1510s.

The terminological confusion has been bemoaned for decades, and other ways of distinguishing production along national lines have been put forward. The most common is that German colour woodcuts are usually original designs but Italian are mostly reproductive. Regardless, the term 'chiaroscuro' remains inaccurate for prints that do not imitate Italian chiaroscuro drawing; it was not a goal to which some colour printmakers could have aspired, especially those active in the decades before it was coined 1516. In this study, it is used only where historically appropriate, namely in reference to woodcuts in imitation of Italian chiaroscuro drawing.

Monochrome Printing, from c.1452–55

In some copies of the first volume of the first book printed with moveable type, the *Biblia latina* (c.1452–c.55), Johannes Gutenberg inked rubrics on folia 1^r, 4^r, 5^r, 129^r and 129^v in red.⁹ That was the first *text* printed in red. He quickly stopped – in the others, the red of the rubrics, initials and printers' decoration is supplied by hand – which may suggest that he did not arrive at a satisfactory working manner, the red ink was relatively expensive, extra labour was required, or any number of other issues. In 1456, his former financier Johann Fust and Fust's associate Peter Schöffer (who became Fust's son-in-law at an unknown date) took over his workshop. The following year, Fust and Schöffer *may* have issued the first image printed in monochrome colour in the Mainz Psalter of 1457, the second book ever printed; their printers' device in monochromatic red survives in only one copy, to

7 On the absence of a term in languages besides Italian through the late 1600s, see C. Kemmer, *Von Cranach bis Baselitz: Meisterwerke des Clair-obscur-Holzschnitts*, exh. cat. (Braunschweig: Herzog Anton Ulrich-Museum, 2003), 12.

8 J. Frankau, *Eighteenth Century Colour Prints: An Essay on Certain Stipple Engravers and their Work in Colour* (New York: MacMillan and Company, 1900), 11.

9 Technical examination showed that the pigment in the red ink is vermilion; R.N. Schwab *et al.*, 'New Evidence on the Printing of the Gutenberg Bible: The Inks in the Doheny Copy', *The Papers of the Bibliographical Society of America* 79 (1985), 375–410, esp. 389. I am grateful to Mayumi Ikeda for her generous comments about the printing of the Mainz Psalter. See M. Ikeda, 'The Fust and Schöffer Office', this volume, 65.

which it may have been added after 1462 (Fig. 2.1).¹⁰ Red printing ink gradually became common for many categories of metal moveable type, especially initials, rubrics and printers' decorations, as well as woodcut or metalcut printers' devices (some of which were printed in both red and black). However, Margaret Smith and Alan May estimated that only 15% of incunabula have text printed in red.¹¹

The earliest published description of colour printing concerns typographic printing in red. The Nuremberg printers Johann Sensenschmidt and Andreas Frisner apologised in the preface to their edition of Peter Lombard's *Glossa magistralis Psalterii*, 1478, for having been forced to omit the printing of red underlining because it proved too hard: 'the words...ought to be noted with a red line underneath, as you will find frequently in codices written with a pen. That was the most difficult to print, for nothing however, except that, was left out'.¹²

The only 'single-sheet' monochrome colour woodcut printed from a fifteenth-century block may be the paper wrapper with two impressions of a woodcut of the Assumption of the Virgin in red-brown ink now at the Bodleian Libraries, University of Oxford; technical analysis could determine if the ink originally appeared black. It was used to bind a 'slim printed book in 4°', apparently printed in 1574,¹³ but it could have been printed earlier and then cut down. The style of the woodcut suggests that it was designed in the early fifteenth century and the only other impression in which it is known was printed in Bologna in 1491. The dozens of monochrome red impressions of sixteenth-century single-sheet woodcuts by prom-

inent designers survive, but all seem to be posthumous impressions (Fig. 2.2).

Jigsaw Printing, from 1457

In the 1457 Mainz Psalter, Johann Fust and Peter Schöffer printed not only black and red text in register, but also bicolour metalcut initials in a jigsaw manner (with letters and surrounding decoration alternately in red and blue) (Fig. 2.1 above). Differently coloured elements of the initials are extremely close together, but the colours never touch. Because it would be practically impossible to ink one matrix so precisely, it has long been accepted that the elements were been first inked and then fit together. On some folios, the elements were inked in both colours, set together into the forme and printed in one run with the text in black. On others, the bicolour initials overlap the black text, indicating that they were added in a second step after the text had been printed in black. On the few where the edges of bicolour initials overlap, bicolour jigsaw units were inked and applied in succession after the black text had been printed (see Ikeda, Fig. 5.4, p. 69).

Fust and Schöffer were the only of the first generation of printers to print in blue ink; in all other cases, blue text and visual elements were supplied by hand (see Ikeda, Fig. 5.2, p. 67). The limited use of blue printing ink may be related to difficulties in finding a serviceable recipe. Even they may have found it difficult to work with. In the Mainz Psalter, many initial bodies that were printed in blue were overpainted in a bright, opaque blue bodycolour, and Mayumi Ikeda has discovered that some were even printed uninked (blind stamped) and then painted blue.¹⁴

The Mainz Psalter includes the first published reference to elements printed in colour but does not specifically mention their colour printing: 'The present book of Psalms, adorned with the charm of capitals and divided sufficiently with *rubrications formed without any penning*

10 ISTC ip01036000, GW M36179. Since the device survives in only one of the ten copies (Vienna, Österreichische Nationalbibliothek, Ink 4.B.1), and since it was not used again until the publication of the 48-line Bible of 1462, there are some doubts about when it was printed. The Vienna copy shows no sign of use, so it could have been kept at the printing office then received the printers' device later, perhaps around 1462. O. Mazal, *Der Mainzer Psalter von 1457: Kommentar zum Faksimiledruck 1969* (Zürich: Stocker, 1969), 79.

11 M. Smith and A. May, 'Early Two-Colour Printing', *Bulletin of the Printing Historical Society* 44 (Winter 1997), 1.

12 'Si verba textus: quotienscunq[ue] inter exponendum: licet plerunq[ue] abbreviata: occurrerint: subductis virgulis rubricu[n]dulis notent[ur]. que[m] admodu[m] in codicib[us] calamo exaratis freque[n]ter rep[er]ies. Et licet idipsu[m] impressioni difficillimu[m] fuerit: pr[a]et[er] id tame[n] haud abs re etia[m] consulto pretermis[su] est. Translated in M. Smith, 'Printing Red Underlines in the Incunable Period: Sensenschmidt and Frisner's 1475 Edition of Justinian's Codex', *Journal of the Printing Historical Society* 10, new series (Spring 2007), 53.

13 Paper wrapper with two impressions of the woodcut *Assumption of the Virgin*, Italy (Bologna?), c.1491, rubbed (or printed in a

common press?) in apparently red-brown ink, 255 × 349 mm (each impression 206 × 144 mm; 14 mm apart). N.F. Palmer and A. Honey, *Blockbooks, Woodcut and Metalcut Single Sheets*, vol. 1 of A. Coates, K. Jensen, C. Dondi, B. Wagner and H. Dixon, with the assistance of C. White and E. Mathew, *A Catalogue of Books Printed in the Fifteenth Century now in the Bodleian Library, Oxford*, 6 vols. (Oxford: Oxford University Press, 2005), 1: 26, XYI-6; accessed 15 January 2014, http://www.bodleian.ox.ac.uk/_data/assets/pdf_file/0010/48871/bod-inc_Blockbooks.pdf. It must be noted that many fifteenth-century single sheet woodcuts and blockbooks were produced with a once black iron-gall ink that has browned over time.

14 M. Ikeda, 'The Fust and Schöffer Office', this volume, 73–74.

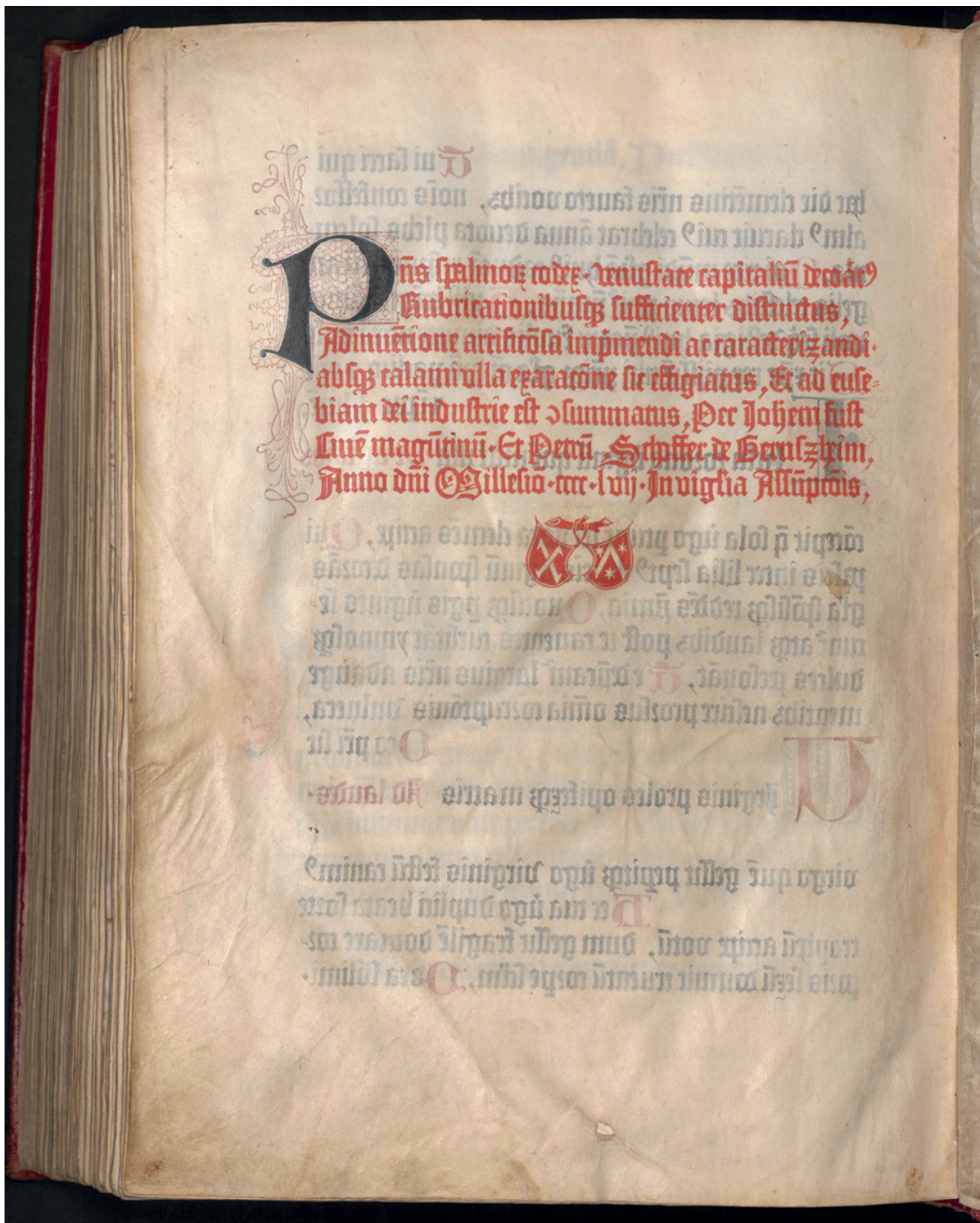


FIGURE 2.1 *Printers' device of Johann Fust and Peter Schöffer, relief print (metalcut?) in red, 25 × 38 mm. In: Psalterium ([Mainz]: Johann Fust and Peter Schöffer, 14 Aug. 1457), colophon (possibly added after 1462)*
 VIENNA, ÖSTERREICHISCHE NATIONALBIBLIOTHEK, INK 4.B.1 ALT INK; WITH PERMISSION



FIGURE 2.2 *Lucas Cranach, Venus and Cupid, woodcut in red, 28.4 x 20 cm*
AMSTERDAM, RIJKSMUSEUM, RP-P-OB-4426

of a reed' (emphasis added).¹⁵ These famous initials are usually considered a one-off experiment, but Schöffer continued to use them through 1490. In at least two books, both printed in 1459, he described them with the same phrase as in 1457: '*sufficienter distinctus*'.¹⁶ Their use over several decades does not invalidate their usual characterisation as a dead-end, since they were used in only a few publications and they remain the only known examples of jigsaw printing in relief.

À la poupée, from 1457 or, 1507(?), 1508

À la poupée inking is associated with intaglio printing after the 1690s, and early relief prints inked in this manner

are a great rarity. However, new research is demonstrating that the earliest example may be coeval with colour printing in relief. In the Mainz Psalter (1457), famous for the jigsaw initials and marginal decoration printed in red and blue (amongst other things), the body of a jigsaw-printed initial in the copy at The John Rylands Library, University of Manchester, was inked *à la poupée* in red and blue and then retouched in red by hand (Fig. 2.3).

If the technique can be broadly defined as the application of multiple colours of printing ink to a *forme*, not a single *matrix*, that was printed in one run through the press, it is attested in book illustrations whose areas of colour do not overlap and are consistently and perfectly aligned. As Ad Stijnman argued, the *forme* in which the woodcut printer's mark of Nicolaus de Benedictis and Jacobinus Suigus in the *Horae* they printed in Turin in 1495 was set was almost certainly inked in this manner.¹⁷ It consists of a frame from four blocks printed in black around the device printed in red. The consistency and perfection of the registration across copies suggests that the blocks were locked into a *forme*, inked with both red and black and then printed from the press in one run. However, the colours do not overlap or even touch. It could have been printed in the jigsaw manner, but that would have complicated an otherwise simple process. Similar examples abound in rare book collections.

This approach was also used to print moveable type in more than one colour. The first page of Ammonius Hermiae's *Commentarii in quinque voces Porphyri*, printed in Venice in 1500 by Zacharias Callierges,¹⁸ may have been inked in this way.¹⁹ Because the edge of a sheet of gold leaf can be discerned on the black type, the black ink and the varnish must have been wet at the same time. That suggests that the *forme* was inked in black (for most text) and varnish (for the heading and decorations) and then printed in one run through the press, after which gold leaf was quickly applied to the varnish before it dried.

The earliest surviving single-sheet woodcut printed *à la poupée* is an impression of Hans Burgkmair's *St George on Horseback* on vellum from two blocks, dated 1508, in a unique palette: the key block was printed with black ink and the highlight block with gold and silver inks.²⁰ Burgkmair created it for Konrad Peutinger at Peutinger's

15 M. Ikeda, 'The Fust and Schöffer Office', this volume, 70.

16 Translated in M. Smith, 'Printing Red Underlines in the Incunable Period: Sensenschmidt and Frisner's 1475 Edition of Justinian's Codex', *Journal of the Printing Historical Society* 10, new series (Spring 2007), 49.

17 ISTC ih00377550, GW 13354. A. Stijnman, *Hochzeit von Bild und Buch: Anfänge der Druckgraphik 1420–1515*, ed. C. Kleine-Tebbe, exh. cat., Wolfenbütteler Hefte 26 (Wiesbaden: Harrassowitz Verlag, 2009), 28.

18 ISTC ia00565000, GW 1618 (+ Accurti(1930) p.123).

19 Stijnman and Kleine-Tebbe, *Hochzeit*, 29.

20 Kupferstichkabinett, Berlin, 3–1924. The metal inks were first discussed in M. Geisberg, 'Burgkmair's St. Georg', in *Festschrift für*



FIGURE 2.3 Initial 'D' inked *à la poupée* (red and blue) in a jigsaw print. In: *Psalterium* ([Mainz]: Johann Fust and Peter Schöffer, 14 August 1457), detail of fol. LVr
MANCHESTER, THE JOHN RYLANDS LIBRARY, 9784; REPRODUCED BY COURTESY OF THE UNIVERSITY LIBRARIAN AND DIRECTOR, THE JOHN RYLANDS LIBRARY, UNIVERSITY OF MANCHESTER

expense so that Peutinger could out-do Friedrich the Wise at his own game. As Peutinger explained in the letter to Friedrich the Wise in 1508 in which he enclosed Burgkmair's prints, because Friedrich the Wise had sent him the previous year 'knights, produced from gold and silver with a printing press [by Friedrich the Wise's court painter Lucas Cranach]...I have therefore also realised knights printed from gold and silver on parchment'.²¹ Peutinger's description

indicates that Cranach sent more than one knight in 1507 (presumably Maximilian I and St George), but only the *St George* survives. It also suggests that Cranach's knights also had highlight blocks printed on parchment with metal inks, possibly also in the manner later known as *à la poupée*, but the two surviving two-block impressions are on paper with the key block in black and the highlight block in monochrome gold or white.

It seems that this manner was not disseminated, but that printers independently arrived at the same novel

ax J. Friedländer zum 60. Geburtstage (Leipzig: E.A. Seeman, 1927), 77; he identified a third metal ink prepared with *Zwischgold* (leaf hammered with gold on one side and silver on the other), but that may be the uneven discolouration of the silver ink. Technical analysis remains to be undertaken.

21 'kurisser, von gold und silber...mit dem truck gefertigt...so hab ich doch von gold und silber auf pïrment getruckt kürisser zuwegengebracht'.

Konrad Peutinger to Friedrich the Wise, 24 September 1508, transcribed in A. Buff, 'Rechnungsauszüge, Urkunden und Urkundenregesten aus dem Augsburger Stadtarchiv', *Jahrbuch der kunsthistorischen Sammlungen des allerhöchsten Kaiserhauses* 13, part II (1892), IIX, no. 8560.

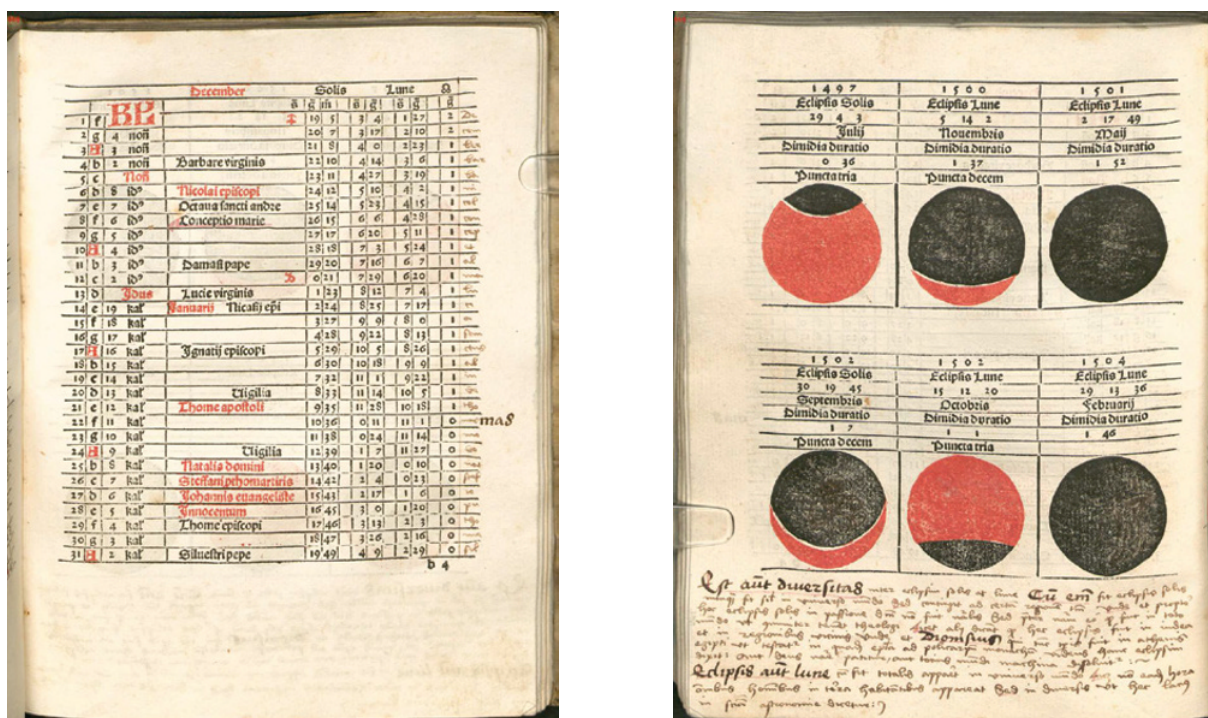


FIGURE 2.4A–B *Recto and verso of a folio with textual and pictorial diagrams printed in colour. 2.4a (recto): calendar of December, moveable type and metal strips. 2.4b (verso): solar and lunar eclipses 1497–1504, first printed by Erhard Ratoldt in 1482, colour woodcuts from two blocks, moveable type and metal strips. In: Johannes Regiomontanus, Kalendarium (Augsburg: Erhard Ratdolt, 1499), n.f.*

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solution. In reissues of Niccolò Vicentino's four-block chiaroscuro woodcut *The Presentation in the Temple* (designed in the mid-sixteenth century) by the Printer of the Red Greek Type, for instance, a mid-tone block was inked in this manner.²² And in 1568, Andrea Brugone's invention of a way to print in red and black simultaneously without removing the paper from the press was considered so momentous that it received a privilege of twenty years in Venice.²³

Printing in Register, from 1482

THE INVENTION(S): ITALY AND THE GERMAN-SPEAKING LANDS, FROM 1482

The invention of colour printing is often understood as 'the invention of colour printing in register'.

The printer Erhard Ratdolt, who is usually celebrated as the inventor of colour printing, moved from Augsburg to

Venice c.1476 and founded a printshop that set international trends in book design. He produced books with decorated initials and floral ornaments that were initially printed monochrome in black, and also in red from c.1480. In 1482 he issued at least seven copies of Euclid's *Elementa geometriæ* with the dedication in gold²⁴ and an edition of Regiomontanus' *Kalendarium* with bicolour diagrams from woodcuts printed in register in black and red (Fig. 2.4).²⁵ Of them, the pictorial diagrams are renowned as the first *images* printed in colour, but they are more accurately described as the first such *woodcuts*; an engraving in red and black from c.1476 was recently described.²⁶ Three years later, around or before November 1485, Ratdolt printed a three-colour woodcut: an astronomical diagram printed in register

24 ISTC ie00113000, GW 9428. On this gold 'printing', see V. Carter, L. Hellinga and T. Parker, 'Printing with Gold in the Fifteenth Century,' *British Library Journal* 9 (1983): 1–13.

25 ISTC ir00094000, GW M37456.

26 A. Stijnman and E. Upper (now Savage), 'Color Prints before Erhard Ratdolt: Engraved Paper Instruments in Lazarus Beham's *Buch von der Astronomie* (Cologne: Nicolaus Götz, c. 1476)', *Gutenberg-Jahrbuch* 86 (2014), 86–105. For an interactive map of the spread of incunabular colour printmaking, see E. Savage, 'Colour Printmaking', in G. Prickman, *Atlas of Early Printing*, atlas.lib.uiowa.edu, forthcoming Summer 2015.

22 S. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 133.

23 C. Witcombe, *Copyright in the Renaissance: Prints and the Privilege in Sixteenth-Century Venice and Rome* (Leyden, Boston: Brill, 2004), 25–26.

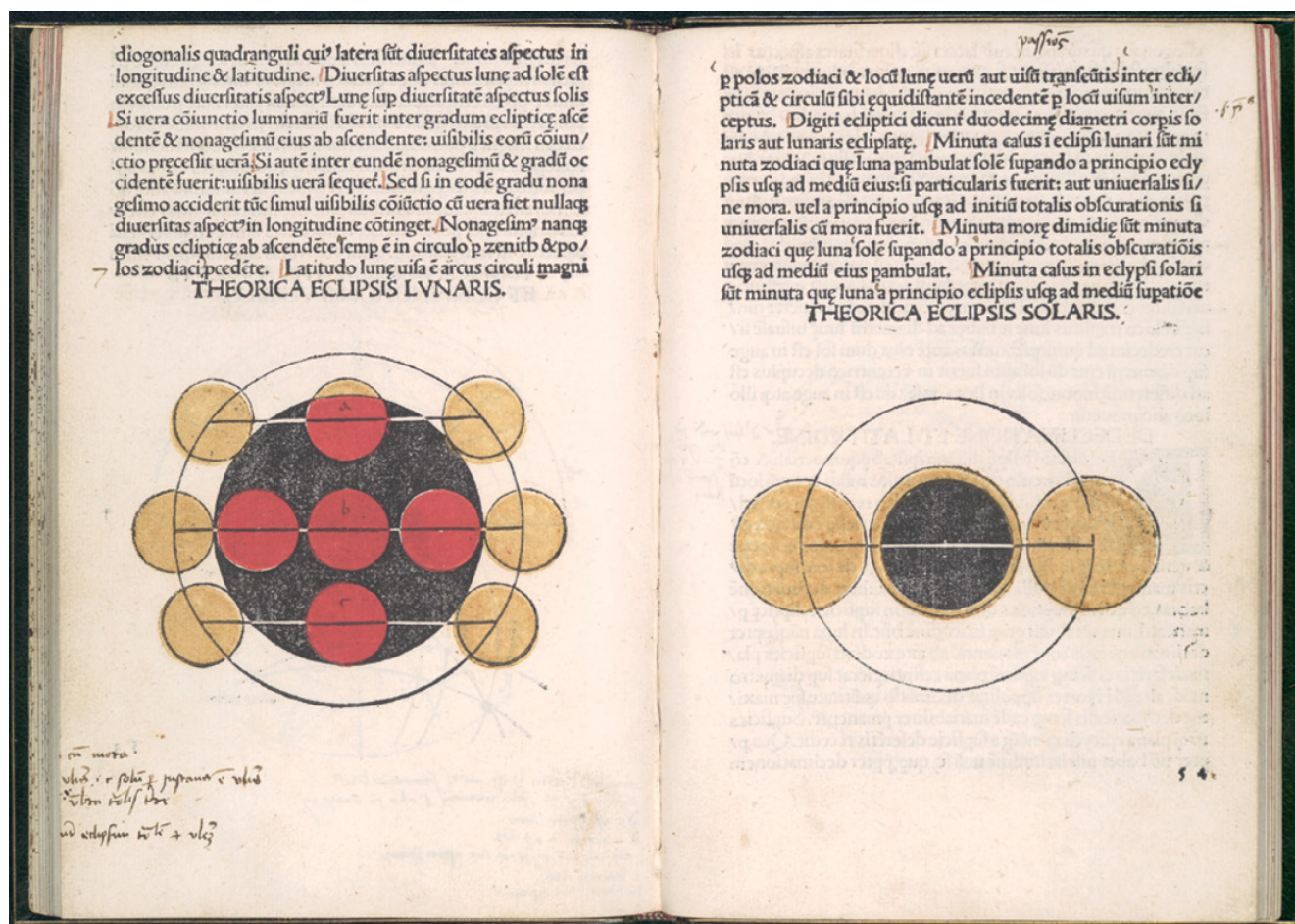


FIGURE 2.5 Theorica eclipsis lvnaris, colour woodcut from three blocks, 7.5 × 9.3 cm. In: Johannes Regiomontanus, *Kalendarium* (Augsburg: Erhard Ratdolt, 1485)

NEW YORK, THE METROPOLITAN MUSEUM OF ART, GIFT OF P.J. SACHS, 1917, INV. NO. 17.45; WWW.METMUSEUM.ORG

in black, red and yellow in Johannes de Sacrobosco's *Sphaera mundi* (Fig. 2.5).²⁷ It has long been celebrated as the first three-colour print in Europe, but it is actually a close second. Six months previously, Ratdolt had printed a woodcut of the coats of arms of Bishop Johann II, Count of Werdenberg, and of the Bishopric of Augsburg in yellow, red and black in the *Breviarium Augustanum* of 30 April 1485 (Fig. 2.6).²⁸ In artistic terms, Ratdolt effectively mechanised stencilling.

In 1486 Ratdolt was called to Augsburg, where he furthered his colour printing methods and produced detailed

human figures in up to five colours. His workshop issued many book illustrations in the 1480s and 1490s and possibly a single-sheet printed in three colours in 1514–19,²⁹ all

27 ISTC ij00406000, GW M14654.

28 ISTC ib01146900, GW 5365. Its previous descriptions as the first-three colour woodcut have been overlooked as a three-colour woodcut. See, for instance, W. Gräff, 'Älteste deutsche Farbenholzschnitte', *Zeitschrift für Bücherfreunde* 1, Neue Folge (January 1910): 366–67; K. Schottenloher, *Das alte Buch* (Berlin: R.C. Schmidt & Co., 1919), 129; *Ibid.*, *Die liturgischen Druckwerke Erhard Ratdolts aus Augsburg, 1485–1522*, Sonder-veröffentlichungen der Gutenberg-Gesellschaft 1 (Mainz: Gutenberg-Gesellschaft, 1922), 1.

29 It was printed on the reverse of a proof of *Missale Augustanum* (Augsburg: Erhard Ratdolt, 1510) [VD16 M 5554] but could, in theory, have been printed by another printer who had bought Ratdolt's material. Anonymous (previously attr. Hans Burgkmair), *Coat of Arms of Cardinal Matthäus Lang von Wellenburg*, colour woodcut in black, red and yellow, undated (printed 22 March 1514–8 June 1519), 415 × 325 mm. Berlin, Kupferstichkabinett, 146–1891. E. Giselbrecht and E. Upper (now Savage), 'Glittering Woodcuts and Moveable Music: Decoding the Elaborate Printing Techniques, Purpose, and Patronage of the *Liber selectarum cantionum*', in *Senfl Studien I*, ed. S. Gasch, B. Lodes and S. Tröster, Wiener Forum für ältere Musikgeschichte 4 (Tutzing: Hans Schneider, 2012), 17–67, esp. 25–27. I would like to thank Berthold Kress, Warburg Institute, University of London, and Georg Dietz, Head of Restoration at the Kupferstichkabinett, Staatliche Museen zu Berlin, for their generous assistance.



FIGURE 2.6 Arms of Bishop Johann II, Count of Werdenberg, and the Bishopric of Augsburg, colour woodcut from three blocks. In: *Breviarium Augustanum* (Venice: Erhard Ratdolt, 30 April 1485), title page
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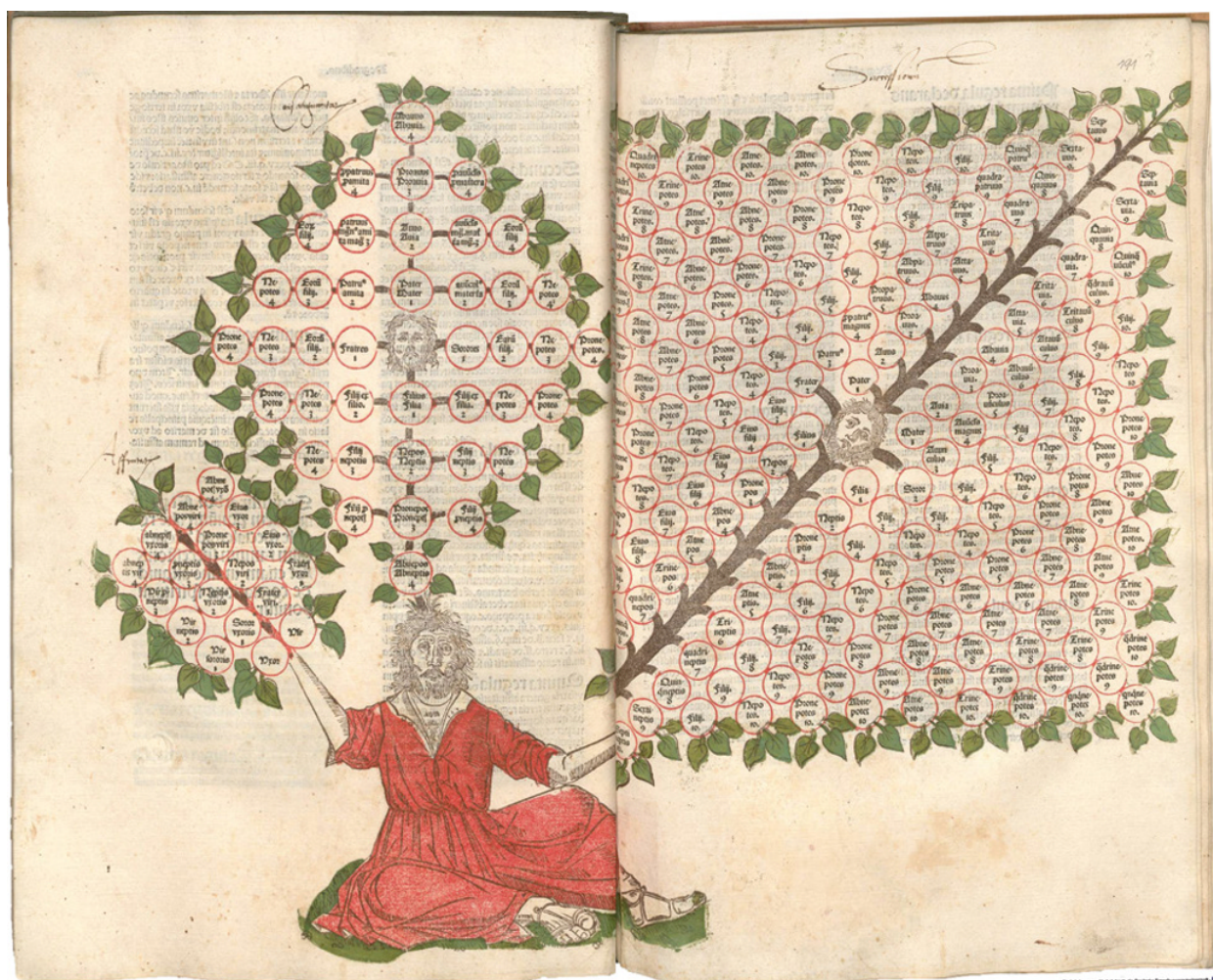


FIGURE 2.7 *Tree of legal terms, woodcut in red with type in black, 31.1 × 28.9 cm. In: Giovanni Crispo de' Monti, Repetitio tituli Institutionum 'De heredibus' et tituli 'De gradibus' cum arbore, ed. Ludovicus Scledeus (Venice: Johann Hamann, 1490), fol. [16]^v–[17]^r*

MUNICH, BAYERISCHE STAATSBIBLIOTHEK, 2 INC.C.A. 3475#BEIBD.2; LICENCED UNDER CC BY-NC-SA 3.0 DE, URN:NBN:DE:BVB:12-BSB00052187-4

with flat areas of colour within black outlines. Other printers issued complex two-colour designs without overlapping colours, including diagrams with red and black elements and pages of text with red and black type, at this time (Fig. 2.7). Some of Ratdolt's colour woodcuts are attributed to the young Hans Burgkmair, who worked in his printshop in the 1490s. Regardless of whether Burgkmair designed the tone blocks as well as the key block (as a 'normal' woodcut), he would have been aware of Ratdolt's colour printing.

Burgkmair was soon drawn into imperial printing projects in Augsburg, many managed by the imperial advisor Konrad Peutinger. Friedrich the Wise challenged Peutinger to the artistic duel, via Cranach and Burgkmair's Kurissers (knights), in 1507 and 1508.³⁰ Later in 1508, the highlight

blocks of Burgkmair's two prints were replaced with tone blocks, which were like those used by Ratdolt but with highlights removed to allow the white of the paper to shine through (for an example of this style, see Klein, Fig. 9.1, p. 105). In 1509, Cranach issued three woodcuts with similarly conceived tone blocks that were falsely (or mistakenly) dated 1506, possibly so that he could claim the idea as his. In 1510, Burgkmair issued a print with three interdependent blocks (all are necessary for the image to

30 On this episode, see D. Landau and P. Parshall, *The Renaissance Print 1470–1550* (New Haven, London: Yale University Press, 1994), 184–91. See also A. Grebe, 'Dürer in Chiaroscuro', this volume, 171–73; E. Savage, 'A Printer's Art', this volume, 28; A. Klein, 'Hans Wechtlin', this volume, 103.

be legible; there is no key block) (see Klein, Fig. 9.3, p. 106), and one what could be called 'hatching blocks' rather than tone blocks in 1512.

These many innovations have variously been considered the 'first steps to chiaroscuro'. However, it must be remembered that printmakers did not necessarily aim to create chiaroscuro woodcuts (the concept did not exist until 1516) and that the many styles that they used, amongst other adaptations, continued to be used in the German-speaking lands for generations.

THE GERMAN-SPEAKING LANDS AFTER 1507

The style of printing tone blocks from which highlights had (or had not) been removed spread quickly in the German-speaking lands, both in book illustrations (especially title vignettes and borders) and in single-sheet prints by leading artists like Hans Baldung (Grien), until the death of Holy Roman Emperor Maximilian I in 1519.³¹ The sole surviving tone block for a single-sheet woodcut from this time was used for printing gold in a deceptive copy of Albrecht Dürer's woodcut of *Maximilian I*, after 1519 (See Grebe, Fig. 15.2-3, p. 176).³² Single-sheets and book illustrations were printed from up to seven blocks (i.e. in up to seven colours, including gold; see E. Savage, Fig. 8.1, p. 96), but most book illustrations were printed in the same red and black inks as the text.³³ A new function emerged in the late sixteenth century, when colour woodcuts that imitated wooden panels were produced as a (presumably cheaper) alternative to intarsia.³⁴ Single-sheets were rarely produced after the initial heyday ended, and only until c.1572, but many woodcut title vignettes and borders were printed with a red tone block through the late seventeenth century.



FIGURE 2.8 *Printer's decorations, metal moveable type, printed in red and black. Detail of Book of Hours for the use of Salisbury (London: Wynkyn de Worde, 1519), fol. 32^v*
PRIVATE COLLECTION

BRITISH ISLES, 1486 AND 1527

In 1486, the year after Ratdolt printed the first three-colour woodcut and the year before he moved to Augsburg, the Schoolmaster Printer in St Albans illustrated dozens of coats of arms in up to four colours in Juliana Berners's 'Boke of blasynge of armys' in the Book of St Albans.³⁵ Whatever the printing technique, their production demonstrates that Ratdolt was not the only printer exploring the possibility of printing in relief in multiple colours at this time. The Schoolmaster Printer's colourful coats of arms of 1486 are celebrated as the first colour prints in the British Isles, but Mark Clarke recently discovered a number of medieval English recipe books whose instructions for block printing/stamping in colour inks attest that manual approaches to colour 'printing' long predate the press in England.³⁶

Histories of English colour printing move from the Book of St Albans to the sudden prominence of colour prints in the mid-eighteenth century or start with the latter, but many English printers printed bicolour pictorial elements in books through the sixteenth and seventeenth centuries.³⁷ As early as the 1510s, printers' decorations (elements set in the forme with moveable type) in red and black could have intricate, interdependent elements of colour that were printed with great precision (Fig. 2.8). The only known images printed with a separate tone block, are on the title page of John of Trevisa's translation of Ranulf Higden's *Polychronicon*, printed in London by

31 This will be discussed in depth in E. Savage, *Vivid Prints: Colour Printmaking and the Transformation of Visual Information in Early Modern Germany, 1476-c.1600* (in progress for 2016).

32 Tone block for deceptive copy of Albrecht Dürer, *Maximilian I*, after 1519 (which survives in two gold-and-black impressions), wood with the apparent residue of gold printing ink, 20.4 × 32.2 × 2.1 cm; Vienna, Albertina, HO2006/668; digitised at [http://sammlungenonline.albertina.at/?query=Inventarnummer=\[HO2006/668\]&showtype=record](http://sammlungenonline.albertina.at/?query=Inventarnummer=[HO2006/668]&showtype=record).

33 For example, the title and all 400 other pages of Petrus Michaelis, *Serta honoris et exultationis* (Cologne: Arnold Quentel, 1567) have a floral frame printed in green ink from a metal cast. See M. Grimm, C. Kleine-Tebbe and A. Stijnman, *Lichtspiel und Farbenpracht: Entwicklungen des Farbdrucks 1500–1800*, exh. cat., Wolfenbütteler Hefte 29 (Wolfenbüttel: Herzog August Bibliothek; Wiesbaden: Harrassowitz, 2011), 16, 18.

34 See E. Savage, 'A Printer's Art', this volume, 100.

35 ISTC ib01030000, GW 4932.

36 M. Clarke, *Middle English Recipes for Painters, Stainers, Scribes and Illuminators* (in progress for 2016).

37 Examples are illustrated in E. Upper (now Savage), 'Tudor Colour Printing: Printing in Relief', *Cambridge University Library Exhibitions*, accessed 15 January 2014, <https://exhibitions.lib.cam.ac.uk/tudorcolour/case/printing-in-register/>.



FIGURE 2.9 Ugo da Carpi, after Parmigianino, Diogenes, woodcut in four colours, before 1532, 49 × 35.4 mm AMSTERDAM, RIJKSMUSEUM, RP-P-OB-31.273

the German printer Peter Treveris for John Reynes in 1527.³⁸ It is relevant that the very simple roundel with the arms of the City of London was printed from interdependent blocks for red and black.

Even if no single-sheets are known and woodcut illustrations that were printed in colour by masking with the frisket sheet were much more common, these examples are sufficient to demonstrate that printers were skilled in printing in colour in relief in Tudor England. The use of interdependent blocks in such a simple image also highlights the unsuitability of using the interdependency of blocks as the sole defining criteria for chiaroscuro woodcut.

ITALY, FROM 1516

The first images printed in colour in Italy were the bicolour (red and black) eclipses printed by Ratdolt in Venice 1485. When Ratdolt returned the Augsburg in 1486, the blocks remained and were reused in reprints of the book by printers in Venice. Other pictorial elements in books,

including complex bicolour printer's devices, were printed in Italy from the 1490s.

In 1516, the artist Ugo da Carpi acquired from the Senate of Venice the first privilege for colour woodcuts for having invented a '*modo nuovo di stampare chiaro et scuro*' (Introduction, Fig. 1, p. 6).³⁹ This is neither a lie nor an exaggeration; regardless of whether he was aware of the earlier woodcuts printed in colour in Venice and abroad,⁴⁰ he defined the term as referring specifically to those that imitated chiaroscuro drawing (wash drawing) (Fig. 2.7). They are printed from interdependent blocks in related tones, without an independent key block in black, and many reproduce works in other media by leading artists including Raphael and Parmigianino. If Ratdolt mechanised stencilling to expedite the production of books in his workshop, Ugo created a way to copy watercolours for the collector's market. He may or may not have been the first artist to produce a single-sheet colour woodcut in Venice – Lucantonio degli Uberti produced a copy of Hans Baldung's *Preparation for the Witches' Sabbath* (1510) dated 1516 in the key block⁴¹ – but he was certainly the first to produce a woodcut in the style of chiaroscuro drawing.

Ugo's manner was followed by Italian printmakers for several generations, and Italian chiaroscuro woodcuts comprise the majority of early modern colour single-sheet prints. Some involved independent key blocks in black (or the darkest tone), and some were used in books in the early sixteenth century. Not all were single-sheets; the best known chiaroscuro book illustration is the two-colour print after Titian of a poet singing to a siren on the title page of Pietro Aretino's *Stanze* (Venice: Francesco Marcolini, 1537).⁴²

The complexity of authorship of prints that are effectively several prints in one is well demonstrated in the output of Andrea Andreani, who prolifically reissued,

39 See N. Takahatake, 'Ugo da Carpi's *Diogenes*', this volume, 116.

40 One woodcut may have been printed in Venice in the same year that Ugo applied for privilege. Attr. Lucantonio degli Uberti, reverse copy after Hans Burgkmair, *Preparation for the Witches' Sabbath* (1510), dated 1516, colour woodcut from two blocks. London, British Museum, 1852,0612.105 see E. Savage, 'Inventing Chiaroscuro: Lucantonio degli Uberti's Copy of Hans Baldung, *Preparation for the Witches' Sabbath*, 1516' (in progress).

41 Attr. Lucantonio degli Uberti, reverse copy after Hans Burgkmair, *Preparation for the Witches' Sabbath*, dated 1516, colour woodcut in two blocks (black and orange), 375 × 257 mm. London, British Museum, 1852, 0612.105.

42 The woodcut has been variously attributed, including to Giovanni Britto, a German printmaker then working in Venice. D. Rosand and M. Muraro, *Titian and the Venetian Woodcut*, exh. cat. (Washington, DC: International Exhibitions Foundation, 1976), 191.

38 Ibid. <https://exhibitions.lib.cam.ac.uk/tudorcolour/artifacts/polycricon/> (accessed 15 November 2013).

reworked, altered and reprinted earlier single-sheet chiaroscuro woodcuts in the early seventeenth century. Few Italian colour book illustrations from this time are known, but in 1627 the Milanese printer Giovanni Battista Bidelli created the first colour-printed scientifically accurate medical illustrations in Gaspare Aselli's *De lactibus sive lacteis venis*. The four fold-out colour woodcuts of organs were printed in (relatively) naturalistic colours from three blocks (Fig. 2.10). Printers continued to innovate, but many fewer colour woodcuts were produced in Italy in the early seventeenth century than in the sixteenth.

FRANCE, C.1544

While the German artist Ludolph Büsinck worked for the printer Melchior Tavernier in Paris 1623–30, he produced a series of chiaroscuro woodcuts reproducing paintings and drawings by Georges Lallemand and Abraham Bloemaert (Dencher, Figs. 16.2–4, p. 181–82). They were accepted as the first chiaroscuro woodcuts made in France, with one or two possible exceptions,⁴³ until 2013, when Catherine Jenkins demonstrated that a group of chiaroscuro woodcuts by the Master ND from the 1540s were not printed in Bologna but in Fontainebleau.⁴⁴ Although the production of chiaroscuro woodcuts for the French court by the Fontainebleau School in the mid-sixteenth century was 'self-contained', as she wrote, it rewrites the history of colour printing in relief.⁴⁵

THE NETHERLANDS, AFTER 1555

Some of the best Netherlandish sixteenth-century printmakers followed Ugo's manner. They include the Flemish artist Frans Floris de Vriendt, who visited Italy in the 1540s and produced chiaroscuro woodcuts in collaboration with the block cutter Joos Gietleughen from 1555 and his students (Fig. 2.11). The prolific artist Hendrick Goltzius also produced chiaro-scuro woodcuts from 1588, and he was the last major chiaro-scuro woodcut designer in Northern Europe (Wouk, Fig. 13.3, p. 154). There was a significant burst of production at the end of the Dürer Renaissance in the 1620s, in which the Amsterdam-based printer Willem Janssen created new Dutch colour woodcuts by reissuing

century-old German woodcuts by Albrecht Dürer (and others) with new tone blocks (Grebe, Figs. 15.4–5, p. 177–78). In the 1630s, the activity of the Flemish blockcutter Christoffel Jegher was also significant, not least because he made colour woodcuts after Peter Paul Rubens.

WORKSHOP PRACTICES AND MARKET DEMAND

The chiaroscuro process was described in detail for the first time in 1766, exactly 250 years after Ugo da Carpi was granted a privilege for his invention, by the French woodcut printmaker and print historian Jean-Michel Papillon. He illustrated the method with a series of four colour proofs and their combined impression (Fig. 2.12) and explained how the blocks were placed in a special contraption and printed on a roller press (not a common press).⁴⁶ This adaptation would not have been available to fifteenth- or sixteenth-century printers, who must have used a common press.

No contemporary description of the design process is known. A clue seems to be in two-colour impressions of a pair of *Landsknechte* (mercenary soldiers) with key blocks after Hans Sebald Beham or Peter Flötner (c.1530s) and new tone blocks.⁴⁷ The design of the tone blocks has been described as puzzling, but this is because they are partially finished (the fiddling details are cut out, but the majority of the surface has not yet been removed) and the impressions are thus trial proofs. However, a number of factors suggest that they were printed in the mid- to late eighteenth century,⁴⁸ and they should not be taken as indicative of sixteenth-century practices.

Few sixteenth-century German tone blocks survive. Besides the block for the darker of two colours of an architectural perspective by Erasmus Loy⁴⁹ and the gold

43 Edmond Douet, after Andrea del Sarto, *Virgin and Child*, colour woodcut from two blocks, 23.3 × 17.2 cm, the key block dated c.1530 and the tone block late sixteenth or early seventeenth century [B. XII.54.9]. Another may have been printed in France; see N. Takahatake, *La Sainte Anne: L'ultime chef-d'oeuvre de Léonard de Vinci*, exh. cat. (Paris: Musée du Louvre, 2012), no. 99.

44 C. Jenkins, 'The Chiaroscuro Woodcuts of the Master ND at Fontainebleau', *Print Quarterly* 30. 2 (June 2013), 131–43.

45 Ibid, 140.

46 J.M. Papillon, *Traité historique et pratique de la gravure en bois*, 2 vols. (Paris: Simon, 1766) 2: 348–50 (colour inks), 366–75 (chiaroscuro printing).

47 *Landsknechte*, colour woodcuts in two blocks (black and green; all known impressions survive in pairs in the same palette); the key block attributed to Hans Sebald Beham and Erhard Schön, respectively, c.1530s, and the tone block probably eighteenth-century. London, British Museum, 1849.1031.257–8; both digitised at www.britishmuseum.org/research. For restrikes of key blocks with new tone blocks see also A. Grebe, 'Dürer in Chiaroscuro', this volume, 171–79 and M. Leesberg, 'Hendrick Goltzius's Chiaroscuro Woodcuts', this volume, 163–70.

48 E. Savage, '"Spotlit" Soldiers: Sixteenth-Century Works-in-Progress or Eighteenth-Century Forgeries?', *Renaissance Man*, ed. Mark Stocker and Phillip Lindley (forthcoming 2016).

49 Munich, Bayerisches Nationalmuseum, R 8992. It was described in W. Strauss, *The German Single Leaf Woodcut 1550–1600* (New York: Abaris Books, 1975), 2: 616.



FIGURE 2.10 *Variously attr. Cesare Bassano or Domenico Falcini, illustration of visceral lymphatics, colour woodcut from three blocks, 40.5 × 25.5 cm. In: Gaspare Aselli, De lactibus sive lacteis venis quarto vasorum mesaraicorum genere novo invento ... dissertatio (Milan: Giovanni Battista Bidelli, 1627), fold-out III*
 © SOPHIA RARE BOOKS, COPENHAGEN, WWW.SOPHIA RAREBOOKS.COM



FIGURE 2.11 *Frans Floris, David Playing the Harp before Saul, colour woodcut from four blocks, 33.0 x 47.5 mm*
AMSTERDAM, RIJKSMUSEUM, RP-P-OB-2164

tone block for the deceptive copy of Dürer's *Maximilian I*,⁵⁰ the only surviving sixteenth-century tone blocks may be those that Paul Heitz restruck and reproduced in facsimile in the 1890s.⁵¹ They are now in the Archives de la Ville et de la Communauté Urbaine de Strasbourg (but uncatalogued and unaccessioned).⁵² Heitz recorded that the designs for the key block and tone block were cut on opposite sides of the same block of wood, but what may be the tone side of all blocks is concealed with a layer of thick card that cannot be removed due to conservation concerns. This economy would have expedited production; the printer could have set the wood-block tone-side up in the forme, printed a batch of paper with red ink, unlocked the forme, flipped over the wood-block, relocked the forme, and printed the outline in black.

Because the two matrices would be of identical dimensions, the forme would not need to be modified and the two impressions should thus have been in perfect registration.

Although nothing is known about the price structure of colour woodcuts until the eighteenth century, when the English artist Elisha Kirkall sold his for a high price explicitly because they were printed in colour,⁵³ it can be assumed that they sold for more than plain impressions. This may be why tone blocks were added to damaged late impressions. They also probably cost more to produce, especially because of the time-consuming overprinting of impressions, which incurred a higher risk of misprints than the usual single-block/matrix impressions. In London in the 1650s, the Stationers' Company sold black ink by the barrel but vermilion (by far the most common red in printing ink, used for printing text) only as a pigment; printers

⁵⁰ See note 31 above.

⁵¹ P. Heitz, *Originalabdruck von Formsneider-Arbeiten des XVI. und XVII. Jahrhunderts*, 3 vols. (Strasbourg: Heitz, 1890–99), 1: Tafel I, nos. 1–3.

⁵² I would like to thank Alice Klein for her assistance in tracking down this collection.

⁵³ E. Hinterding, 'Introduction to the History of the Chiaroscuro Woodcut', *Chiaroscuro Woodcuts from the Frits Lugt Collection in Paris [English Text Supplement]*, exh. cat., ed. S. Watanabe (Tokyo: National Museum of Western Art: Western Art Foundation, 2005), 15.



FIGURE 2.12A–E *Jean Michel Papillon, impressions of four tone blocks and a black keyblock, both individually and as a finished colour woodcut from four blocks, 16.1 × 8.9 cm. In: Jean Michel Papillon, Traité historique et pratique de la gravure en bois, 3 (in 2) vols. (Paris: Pierre Guillaume Simon, 1766), vol. 2, between pp. 154–55*
WOLFENBÜTTEL, HERZOG AUGUST LIBRARY, UH 64

either had to prepare it themselves⁵⁴ or ‘pay an Inck-maker for good Inck, which may yet be better or worse according to the Conscience of the Inck-maker’, as Joseph Moxon wrote in the 1690s.⁵⁵ Additional wages for printers who had to pull extra impressions would have been

another expense specific to colour printing. In Frankfurt in 1573, jobbing printers who pulled two impressions (red and black) on title pages were entitled to a beer bonus, called a ‘*Rotdruck*’ (red print), ‘*Titulgeld*’ (title-page money), or, later, ‘*Titelbier*’ (title-page beer).⁵⁶

The implications of these and other similar indications of the economics of early colour relief printing are limited because market structures varied in different places and times and colour printing practices varied in each printshop.

54 D. McKitterick, *A History of Cambridge University Press* (Cambridge: Cambridge University Press, 1992), 284.

55 J. Moxon, *Mechanick Exercisess: Or, the Doctrine of handy-works: Applied to the Art of Printing* (London: Printed for Joseph Moxon, 1693), 82. Quoted in McKitterick, *History of Cambridge University Press*, 455, note 10.

56 R. Reith, *Lohn und Leistung: Lohnformen im Gewerbe, 1450–1900* (Stuttgart: Fritz Steiner Verlag, 1999), 221.



FIGURE 2.12A-E



FIGURE 2.13 Pyramus and Thisbe, woodcut from two impressions (black and red) of one woodcut, title page of *Pyramus ende Thisbe* ([*Thantwerpen: Henrich Peeterssen van Middelburch, c.1540*])
 WASHINGTON, DC, LIBRARY OF CONGRESS, PQ1501.P9 A63, ROSENWALD 1160

For instance, the cost of red ink in London in the 1650s is relevant only to that material in that place and time, not least because the Stationers' Company enforced a unique market structure and all known English colour prints before c.1700 are in relief and in red and black, with two exceptions.⁵⁷ Nevertheless, they point to one conclusion: printing in colour required a special effort. Given the complexity and expense of colour printing, the fact that so many printers repeatedly issued impressions in colour suggests that they earned a return on their investment in materials, labour and time. This, in turn, indicates a sustained market demand for printed colour (albeit in different forms, for different purposes and for different audiences) in book and print cultures across Europe before 1700.

Combination Techniques

AUSTRIA, THE LOW COUNTRIES, MEXICO, PORTUGAL, RUSSIA, SPAIN, SWITZERLAND, AND OTHER LANDS., FROM C.1510

In the rest of the European printing world, and eventually in the colonies, many images were printed in colour throughout the sixteenth century. As in England, all but very few are book illustrations (namely Zodiacal Men in almanacs, as well as title borders and vignettes) that were printed in red and black at the behest of printers (not designers). These printers were also printing texts in red and black, and they masked woodcuts with a frisket sheet so that certain areas of the image would print in red, black,

and red/black (Fig. 2.13).⁵⁸ These colour impressions have escaped both art historical and bibliographical attention because they are pictorial elements in books, but they are plentiful even in areas where it is thought that colour printmaking was introduced centuries later. Their production in the colonies and as far east as Russia attests that colour printmaking, however broadly defined, is not only a pan-European development (even if it seems to have initially been led by German printers working abroad), but also a global development. It furthermore illustrates the importance of interdisciplinary approaches (bibliographical/art historical/technical) for understanding the history of colour printing.

Colour Printing in Relief after 1700

The heyday of chiaroscuro printmaking (in any form) ended as woodcut was superseded by intaglio around 1600, but single-sheet colour woodcuts continue to be produced, notably even if rarely and in small numbers, in the early seventeenth century. By the mid-seventeenth century, production was even more scattered. There are exceptions – the Bolognese artist Bartolommeo Coriolano had great success with colour woodcuts, for instance – but the market had turned to prints with more precise designs and more accurate colours, including designs in intaglio combined with woodcut tones. Although book illustrations continued to be produced, the few single-sheet colour woodcuts printed in the early seventeenth century tended to be made in short-lived bursts for an elite market, as did the even fewer from the late seventeenth century. When Jacob Christoff Le Blon invented trichromatic printing around 1710, colour woodcut was far past its prime.

57 The sole known English colour impressions of intaglio prints from this time are in monochrome blue, now faded to grey or greyish brown; Stijnman, Fig. 3.2, p. 44. Savage (formerly Upper), 'Tudor Colour Printing: Intaglio Colour Printing', *Cambridge University Library Exhibitions*, exh. cat., 2013, accessed 15 January 2014, <https://exhibitions.lib.cam.ac.uk/tudorcolour/artifacts/john-shute/>. Another etching was printed in white ink on black paper; N. Grew, *The Comparative Anatomy of Trunks, Together with an Account of Their Vegetation* (London: Kettily, 1675), fig. 26.

58 Savage, *Vivid Prints*. On technical aspects of their production, see E. Upper (now Savage), 'Red Frisket Sheets, c. 1490–1700: The Earliest Artefacts of Colour Printing in the West', *Papers of the Bibliographical Society of America* 108, no. 4 (December 2014): 488.

Colour Printing in Intaglio before c.1700: A Technical History¹

Ad Stijnman

In the first three centuries of the early hand-press period, intaglio printmakers experimented with all kinds of intaglio colour printing methods. From the second half of the fifteenth century until the creation of the first technique that reproduced colours accurately c.1700, printers and designers used innovative and experimental printing techniques and inks to convey different kinds of information and create distinctive visual effects. Many of their works were single-sheet prints, many were book illustrations and many have not been recorded as being printed in colour.

The earliest known colour-printed engravings, from the 1460s, were monochrome (i.e. non-black). Polychrome processes (for printing an image in multiple colours) developed from c.1500, but the available materials and technologies limited the range of hues. Once intaglio printmaking was established as the primary graphic process in Europe in the seventeenth century, colour-printed engravings and etchings appeared on a larger scale. A radically different approach was developed by Jacob Christoff Le Blon around 1710:² he superimposed impressions of three different plates inked in blue, yellow and red, respectively, using a keyplate in black or blue if necessary, to create one image. For the first time, colour prints could accurately represent all colours. His trichromatic method led to the first commercially viable approach to colour printing on a mass scale and led to our CMYK printing (Cyan-Magenta-Yellow, with a black Keyplate).

This chapter presents a brief historical overview of intaglio colour printmaking, incorporating art historical and bibliographical research as well as the history of printing techniques. It argues that some methods of colour printing in intaglio were greatly more common than has been realised, and it calls for an interdisciplinary approach centred on the role of printers (i.e. of books and of single-sheet artworks).

Monochrome

Intaglio colour printing developed only gradually before 1700. Monochrome colour-printed engravings and etchings appear regularly from the fifteenth century, and some experiments with polychrome intaglio printing date from the time that chiaroscuro woodcut emerged *en force* in the 1520s. The earliest example printed with non-black ink is a *Madonna with Child in a Garden* (c.1465–67) by Master ES, printed with white ink on black prepared paper (Fig. 3.1). The copperplate was engraved specifically to be printed in white upon black, as the engraved highlights and whites of the eyes show. This may be regarded as an experiment, both in artistic design and technical skill.

Other fifteenth-, sixteenth- and seventeenth-century plates that were printed in monochrome blue, green, brown or red are more commonly known in black, although there are exceptions. The reasons for monochrome colour printing may have ranged from practical, such as to distinguish designs for goldsmiths (printed in yellow-brown)



FIGURE 3.1 *Master E.S., Madonna and Child in a Garden, c.1465–67, engraving, printed with white ink on black-coated paper, 10.6 cm in diameter*
WASHINGTON, DC, NATIONAL GALLERY OF ART,
NEW CENTURY FUND, 1999.27.1

¹ For an extensive, illustrated discussion, see A. Stijnman, *Engraving and Etching 1400–2000: A History of the Development of Manual Intaglio Printmaking Processes* (London: Archetype; Houten: Hes & De Graaf, 2012), 341–65.

² On the spelling of Le Blon's given names, see the Foreword, X, nt. 8.

from those for silversmiths (printed in blue),³ to commercial, making the prints more attractive to collectors. For instance, a number of the etchings of the School of Fontainebleau (produced 1542–48) are printed monochrome in red-browns or purple-browns, possibly to appeal to collectors of popular red-crayon drawing in the French court.⁴ Some were private, rather than commercial, undertakings: Hercules Segers' famous but rare etchings from c.1615–30 were printed in blue, brown, green and grey on white paper, and pale yellow and white on dark prepared paper (but not in orange, red or purple inks), and he altered nearly all of the rare surviving impressions by further hand-colouring so that each impression has unique features.⁵

Monochrome intaglio printing is thought to have been unusual – and, in the grand scale, it was – but it was undertaken much more often than has been realised. One reason is that some monochrome intaglio prints have darkened or faded significantly, so they now look browned or greyish respectively. For instance, the colour of the four engraved plates in John Shute, *The first and chief groundes of architecture* (London: Thomas Marsh for John Shute, 1563) is invariably described as 'grey' (if it is mentioned at all). However, in the copy at Cambridge University Library, the presence of blue pigment particles on the verso of most, and also the greyish blue discolouration of the ink on the recto and greenish discolouration on the verso of one indicate that they may have originally been an indigo blue (Fig. 3.2); the green presumably derives from the yellowing of the oil medium in which the blue pigment is suspended.⁶ The number of extant monochrome intaglio prints suggests that a case can now be made for its continuous production, in increasing quantities, from the late fifteenth century.

Polychrome

Colour printing in 'composite prints', or prints made of smaller prints joined together, became less rare in the nine-

teenth century. However, a composite engraving from a book printed c.1476 was recently identified as both the earliest known multi-colour engraved image and the earliest known multi-colour book illustration (Fig. 3.3). Each plate used in this three-layer volvelle (paper instrument comprised of layers of rotating dials) was inked in monochrome red or black and then manually 'printed' by rubbing (the rolling press was not yet available in the area where it was made). However, it is included here because it is an integral part of the otherwise mechanically printed book and the volvelle itself, if not its individual parts, was created with different colours of printing ink. In the three surviving copies in which the volvelle survives intact, the base plate and two dials are made of different colour combinations.⁷

À LA POUPÉE PRINTING

The oldest extant example of a polychrome intaglio print is an impression of an engraving of *The Madonna Adored by Saints of the Dominican Order* (c.1525) by Agostino Veneziano of which the Virgin and Child is inked in red and the remainder in blue. More specimens are found in the following period; the title plates for Wendel Dietterlin's *Architectura* (1593, 1595) have the lower inserted plates inked *à la poupée* in red and black, respectively. The same combination of colour printing techniques is repeated in a number of copies of the second edition (1598) expanded to five volumes, each volume with its own title page. A copy of Heinrich Zeising's *Theatrum machinarum* has the etched title page of the first part (1607) inked *à la poupée* in green, black and violet inks. The colour printing clarified and decorated the image.

Between 1688 and 1698, Johannes Teyler, a philosopher by training and mathematician and military engineer by profession, financed a Dutch workshop for the printing of engravings and etchings in a novel manner.⁸ One plate was inked in several different colours and printed in one run through the press, making each impression effectively a unique 'printed painting' with deep purples, vivid oranges, cool turquoise blues and lush greens. This process, later known as *à la poupée* printing, was first described in the third edition of Abraham Bosse's treatise on etching (1745).⁹ It was next described forty years later by Robert Laurie:

3 M. Grimm, C. Kleine-Tebbe and A. Stijnman, *Lichtspiel und Farbenpracht: Entwicklungen des Farbdrucks 1500–1800*, exh. cat., Wolfenbütteler Hefte 29 (Wolfenbüttel: Herzog August Bibliothek; Wiesbaden: Harrassowitz, 2011), 86–91.

4 C. Jenkins, 'The Chiaroscuro Woodcuts of the Master ND at Fontainebleau', *Print Quarterly* 30.2 (2013), 131–43, esp. 138; C. Jenkins, *Printmaking Masters of Fontainebleau*, exh. cat. (New York: Metropolitan Museum of Art, forthcoming 2017).

5 See J. Nakamura, 'On Hercules Segers', this volume, 189–195.

6 Technical examination remains to be undertaken, but impressions in the copy at Cambridge University Library, Syn.3.56.1, appear to have been printed in an indigo ink that has faded to grey. E. Upper (now Savage), 'Tudor Colour Printing: Intaglio Colour Printing', *Cambridge University Library Exhibitions*, accessed 15 January 2014, <https://exhibitions.lib.cam.ac.uk/tudorcolour/case/intaglio-colour-printing/>.

7 A. Stijnman and E. Upper (now Savage) 'Color Prints before Erhard Ratdolt: Engraved Paper Instruments in Lazarus Beham's *Buch von der Astronomie* (Cologne: Nicolaus Götz, c.1476)', *Gutenberg Jahrbuch* 89 (2014), 86–105.

8 See the volumes on Johannes Teyler by A. Stijnman, ed. S. Turner, in *New Hollstein Dutch & Flemish* (Oudekerk aan den IJssel: Sound & Vision, forthcoming 2016). See S. Turner, 'Opus typo-chromaticum', this volume, 196–206.

9 A. Bosse, *De la maniere de graver a l'eau forte et au burin*, ed. C.-N. Cochin, 3rd ed. (Paris: Jombert, 1745), 128.

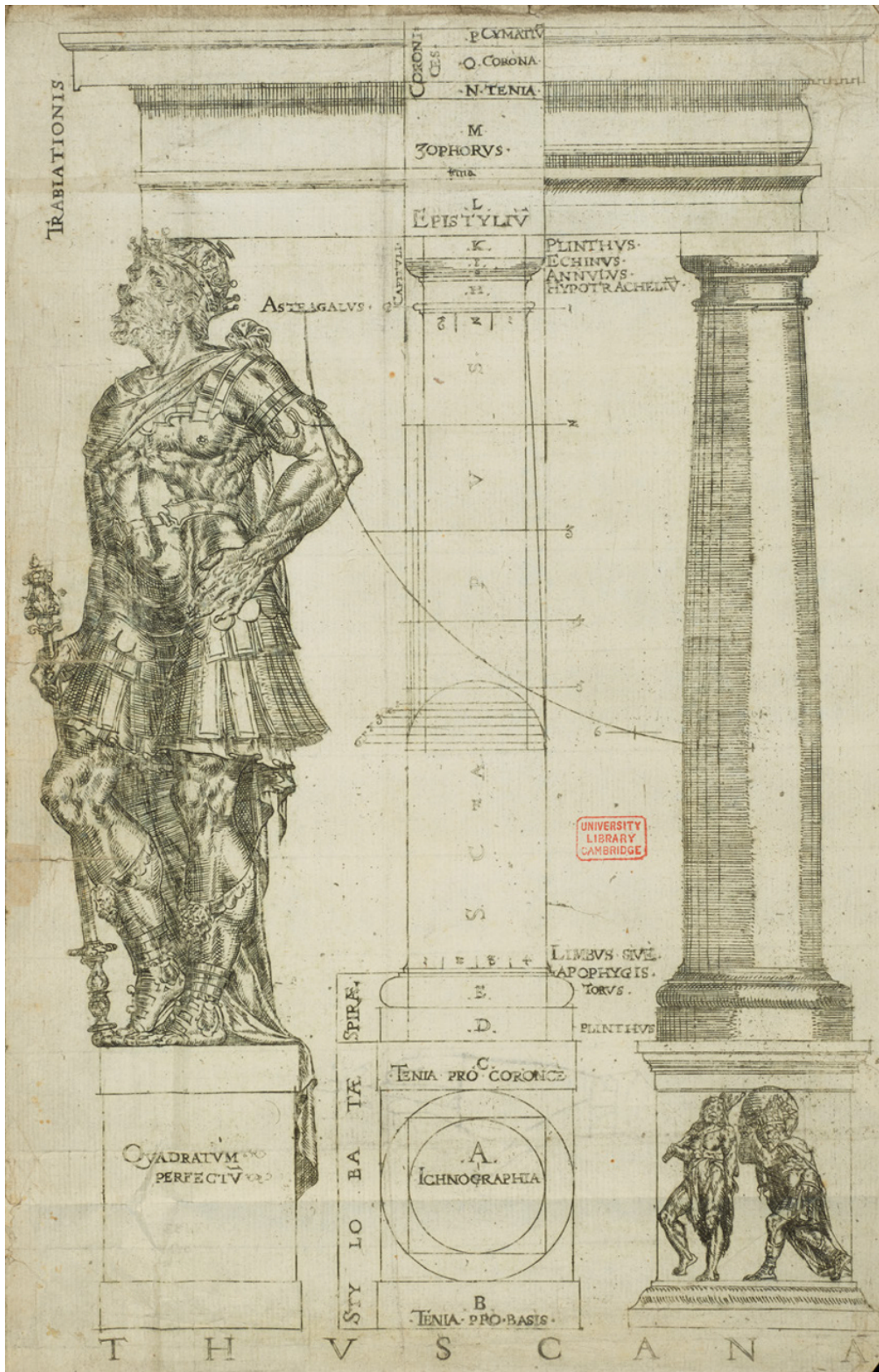


FIGURE 3.2 Thvscana, engraving, printed in blue ink, 34.2 × 23.5 cm
 In: John Shute, *The first and chief groundes of architecture* (London: Thomas Marsh for John Shute, 1563),
 pl. 1, between fol. Biii^r and fol. Biv^r
 CAMBRIDGE (UK), UNIVERSITY LIBRARY, SYN.3.56.1



FIGURE 3.3 *Instrumentum veri motus lune*, three-layer engraved volvelle, manually printed (rubbed) in black, black and red ink, respectively

In: Lazarus Beham, *Buch von der Astronomie* (Cologne: Nicolaus Götz, [c.1476]), fol. g2^v

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The Plate being warmed in the usual manner, the Colours are applied by means of Stump Camel hair Pencils, to the different parts, as the subject suggests; it is then wiped with a coarse gauze Canvas, any other being improper; after this it is wiped clean with the hand as in common practice; and being again warmed, is passed through the Press. The Colours are mixed with Burnt Linseed Oil, and those generally used by Painters are proper.¹⁰

In a decade, Teyler's workshop produced impressions of over 600 different plates in up to eight bright colours per impression to enhance perspective (in landscape designs), represent volume (in designs of objects), record natural colours (of birds, mammals, insects and flowers) and enhance decoration (of garlands).

It became common from 1695, when Amsterdam publishers began issuing engravings, etchings and mezzotints printed *à la poupée*, continuing the practices of Teyler's workshop.¹¹ The method was soon disseminated across

¹⁰ R. Laurie, 'Account of a Method of Printing Mezzotinto Prints in Colours' (dated 21 November 1776), *Transactions of the Society for the Encouragement of Arts, Manufacture and Commerce* 2 (1784), 145–48.

¹¹ See E. Kolfin and M. Rikken, 'Colourful Topography', this volume, 207–215.

Europe. It redefined what colour prints could be as new markets for colour printing were developing in the eighteenth century, and it triggered the eighteenth-century wave of intaglio colour printing.

JIGSAW PLATE PRINTING

Jigsaw intaglio printing with two or more conjoined plates, each inked in a different colour, seems to have developed from the second half of the sixteenth century. The title plate by Konrad Saldörffer for Nicolas de Nicolay's record of travelling through Turkey from 1572 is the earliest known example.¹² The larger rectangular plate is in black, the inserted oval plate with the title in red. Jigsaw prints in two colours also appeared after 1600 but rarely.¹³ The first volume of Wendel Dietterlin's *Architectura* (1593) and the second volume (1595) – already mentioned above – have etched title plates each with two small text plates cut out of the main plate. Of the text plates, the upper ones are printed monochrome in red or black and the lower ones inked *à la poupée* in red and black, respectively.

Printing in Register

The future was for intaglio printing in register. In this process, impressions of two or more plates are superimposed on the same sheet in consecutive print runs to compose one image. The etched title plate to the fourth part of Heinrich Zeising's *Theatrum machinarum* (1613) is the earliest known example and has adjacent colours, but the single-leaf prints by François Perrier of c.1635 are better known.¹⁴ They are not unlike chiaroscuro woodcuts, but the highlights are printed from an etching inked in white over a second etching in black on brown paper.¹⁵ Other seventeenth- and eighteenth-century examples from the Low Countries use similar technical approaches. One impression by Hercules Segers (HB 25 I b, *Road Skirting a Plateau, a River in the Distance*) of c.1615–30 is printed from two etched plates in black and white on paper prepared with a blue wash.¹⁶ Around 1660–70 Jan van de Velde IV produced an etched portrait of an old man from two plates, one for the face in red ink and one for the rest of the image in

black ink, on white paper, with the black and the red overlapping to produce a skin tone.¹⁷ Examples are again found in both books and in single-sheet prints.

Terminology

Like with relief colour printing, no historical terms for intaglio colour printing have come down to us. The later reception of colour prints reflects this in its terminological difficulties. Egbert Haverkamp Begemann demonstrated the evidence in his authoritative study of the prints of Hercules Segers:

[T]hat the auction catalogue of the sale of the *Pinacotheca archetiparum imaginum* on February 13, 1688 mentions, on p. 12, '9 [landscapes] *Herculis Segers clair obscure*'. This entry is doubly significant in that it indicates that early collectors assigned Segers' etchings to the category of chiaroscuro prints – a fact that reflects on Hinloopen's interest in them.¹⁸

This does not imply that seventeenth-century Englishmen were incapable of observing these objects' colour printing but that they found Segers's work so novel that they did not have a term for it. For want of other options, they used the more common expression '*clair obscure*'.

Contemporary descriptions for *à la poupée* printing can be equally problematic. The expressions '*miniaturen*' (miniatures) and '*miniatur-drukken*' (miniature prints) are used in connection with prints produced by Johannes Teyler in an auction catalogue of 1708.¹⁹ Apparently the best term available for these *à la poupée* impressions was that for small, colourful paintings in manuscripts. One would not expect the term 'miniature' to refer to colour printing today. But originally, 'miniature' derived from 'minium' (a red lead pigment) and the Latin '*miniare*' (to paint in red) in medieval manuscripts, and 'miniature' was then linked to the Latin '*minimus*' (smallest) because colour images in medieval manuscripts are small. Searching for '*à la poupée* printing' in seventeenth- and

12 N. de Nicolay, *Der Erst Theyl von der Schiffart und Rayss in die Türkei unnd gegen Orient* (Nuremberg: Gerlatz, 1572).

13 Book illustrations: G.P. Harsdörffer, *Peristromata Turcica, sive dissertatio emblematica, praesentem Europae statum ingeniosis coloribus repraesentat* (Nuremberg: Endter, 1641). Print series: J. Pine, *The Tapestry Hangings of the House of Lords* (London: Pine, 1739).

14 See A. Dencher, 'The "Camaïeu" Print', this volume, 180–83.

15 A. Bosse, *Traicté des manieres de graver en taille douce sur l'airin* (Paris: Bosse, 1645), 74–75.

16 See J. Nakamura, 'On Hercules Segers', this volume, 191–92.

17 Stijnman, *Engraving and Etching*, 358, fig. 290.

18 E. Haverkamp-Begemann, ed., *Hercules Segers: The Complete Etchings and a Supplement on Johannes Ruischer* (Amsterdam: Scheltema & Holkema, 1973), 4–5.

19 *Catalogus van een groote party...land en zeekaarten...eenige fraaye Tekeningen en Miniaturen, eenig ongemeen fyn WINKELGOED...en eindelyk eenige KOPERE PLAATEN...welcke verkoft zullen worden by executie...Dingsdag, den 7. Augusti, 1708 en volgende dagen...* (Amsterdam: Johannes Ratelband, [1708]), 18.

eighteenth-century sources would be fruitless because the term was not used before 1900.

Although inking one block or plate in multiple colours is attested in woodcuts, engravings and etchings from the early sixteenth century, the first description of ‘à la poupée inking’ of 1745 is without using this expression.²⁰ The phrase was probably not common before the twentieth century, as Julia Frankau (1900) seems the first to have recorded that inking a plate is done ‘with brush, poupée, or stump’.²¹ These were tradesmen’s terms; she learned about these processes from workmen at two London plate printing firms, as she states, and from stories of his experiences with English colour printing by ‘Mr Minasi’, a plate printer who had worked for Francesco Bartolozzi around 1800 and later lived next to her grandfather.

Ten years later Robert Burch described that inking a plate is carried out ‘with a stump brush or piece of rag – à la poupée, as the French term it, the dabber used to apply the ink being shaped somewhat like a wooden doll (French, *poupée*)’.²² Burch’s French terminology seems to echo the word ‘*poupée*’ the way it is used by Frankau, as well as her

words ‘stump’ and ‘brush’. If it had derived from a visit to a Paris printshop, he would probably have used a more original expression. It is still unclear how a Dutch late seventeenth-century manner of multi-colour inking became known by a French term that is not found before 1900, which underscores the necessity for separate inquiry into the development of particular terms in print scholarship.

New Ways of Colour Printing

These rather straightforward approaches to printing colours in intaglio and the combinations of intaglio and relief colour printing continued to be used after 1700. Critically, there was no theory to support the printing in multiple colours, particularly the overprinting of layers of different inks to create composite colour hues, until c.1710. Of course, printers understood how to overprint texts, blocks and plates, and every painter and printer knew how to mix blue and yellow for green, red and yellow for orange, and so on. But all this changed with the revolutionary approach that Jacob Christoff Le Blon developed in Amsterdam c.1705–10.²³

20 Bosse, *Maniere de graver*, 128.

21 J. Frankau, *Eighteenth Century Colour Prints* (London: Macmillan, 1900), 61–62.

22 R.M. Burch, *Colour Printing and Colour Printers* (London: Pitman, 1910; rpt. Edinburgh: Harris in association with Hilger, 1983), 88.

23 This is described in detail by A. Stijnman in the Conclusion, this volume, 216–18.

PART 2

The Advent of Colour Printing, c.1400–1500

∴

Colour Stamping in the Late Fifteenth and Sixteenth Centuries: Technical Sources and Workshop Practice

Doris Oltrogge

We know that the very earliest colour printing inks, used around and soon after Johannes Gutenberg's invention of the printing press c.1455, involved a colourant (e.g. a pigment), a binding medium (the liquid in which the pigment is suspended) and possibly additives (such as driers), like all inks. However, their components have been little investigated. In incunabula, books printed between c.1455 and 1500, our knowledge of the ingredients of the printing inks is based on the publication of the results of technical examinations of black and red typographic inks,¹ although the published research on the red consists of a single casual remark. Research into black and colour printing inks of blockbooks, intaglio and chiaroscuro prints is only just beginning, and it is necessarily based on assumptions about fifteenth-century printing inks and ink used for stamping (block printing) related material, such as fabric decorated with colour woodcuts.² However, the earlier inks are themselves little analysed, and their components have not been compared to contemporary recipes for early colour inks. Research into printing inks in incunabula and their comparison with inks used for other contemporary forms of 'printing', including stamping and rubbing, could elucidate workshop practices and allow objects to be attributed to specific areas or workshops as well as dated.

The very few early ink recipes for printing on paper that have survived have never been surveyed together. They include two references to red typographic ink and many for creating colour impressions of woodcuts by manually pressing inked woodblocks onto a support. The majority call for supports besides paper, namely leather or fabric. For the purposes of this discussion, this is called 'stamping' (rather than 'block printing' or 'printing'), and 'printing' is reserved for impressions made with a printing press. This distinction does not appear in contemporary sources: both techniques are called 'printing' (*drucken, trucken, prynten, setten*). The majority are for stamping on leather or fabric. Those for fabric are particularly important to the understanding of the development of colour printing inks because woodcuts for stamping fabric were closely related to early woodcuts on paper,³ and even used on paper,⁴ and because printmakers experimenting with colour prints on paper may have been aware of the practice of stamping textiles and leather objects in colour.

This paper aims to bridge the gap between the manual production of colour 'prints' and the emergence of mechanised colour printing, starting before the invention of the printing press c.1400 and ending after the emergence of the printing press c.1570. It focuses on the transitional period between manuscript culture and book culture in the late 1400s and early 1500s. Based on

- 1 For black typographic ink see: R.N. Schwab et al., 'Cyclotron Analysis of the Ink in the 42-line Bible', *The Papers of the Bibliographical Society of America* 77 (1983), 285–315; H. Mommsen et al., 'X-ray Fluorescence Analysis with Synchrotron Radiation on the Inks and Papers of Incunabula', *Archaeometry* 38 (1996), 347–57; A. Rosenberg et al., 'Röntgenfluoreszenzanalyse der Druckerschwarzen des Mainzer Catholicon und anderer Frühdrucke mit Synchrotronstrahlung', *Gutenberg-Jahrbuch* 73 (1998), 231–55. For red typographic ink see: R.N. Schwab et al., 'New Evidence on the Printing of the Gutenberg Bible: The Inks in the Doheny Copy', *The Papers of the Bibliographical Society of America* 79 (1985), 375–410, esp. 389.
- 2 A. Stijnman, *Engraving and Etching 1400–2000* (London, Archetype; Houten, Hes & De Graaf, 2012), 276–78. For blue pigments in incunabula, see M. Ikeda, 'The Fust and Schöffer Office', this volume, 65–75. On browned ink in blockbooks, see A. Stijnman, 'The Colours of Black: Printing Inks for Blockbooks', B. Wagner, ed., *Bibliothek und Wissenschaft* 46 (2013), 59–80. For current research on the inks of sixteenth-century Italian chiaroscuro woodcuts, see B. Price et al., 'A Technical Study', this volume, 140–50.

- 3 R.S. Field, 'Early Woodcuts: The Known and the Unknown', P. Parshall and R. Schoch, ed. *Origins of European Printmaking: Fifteenth-century Woodcuts and their Public*, exh. cat. (Washington: National Gallery of Art; New Haven, London: Yale University Press, 2005), 19–35, esp. 21–26.
- 4 CPG 558, fol. 149^v, ch. 27 (ed. Oltrogge, Datenbank). The term for the process is the same as for stamping fabric, *auftrucken*; it is not possible to decide whether the recipe was intended for printing or stamping on paper. For an example see Nuremberg, Stadtbibliothek, Inc. 165.2^o, doublure, fifteenth century (see C. Sauer, 'Frühe Platteneinbände in der Stadtbibliothek Nürnberg', *Einbandforschung: Informationsblatt des Arbeitskreises für die Erfassung, Erschließung und Erhaltung historischer Bucheinbände* 26 (2010), 29–43, esp. 30f. with ill.). Leyden, fol. 144^v–45^r, is also intended for printing on parchment; Stijnman, 'Colours of Black', 65.

the textual analysis of fifteenth- and sixteenth-century recipes for colour printing inks and the technical analysis of actual colour printing inks from this time, it presents a detailed examination of the earliest documentation of the materials and techniques used for producing colour impressions and defines their place in contemporary workshop practice.⁵ It demonstrates that a strong workshop tradition of colour relief stamping on fabric and leather existed long before the development of colour printing on paper.

Sources

The first known reference to colour inks is Cennino Cennini's instructions for stamping fabric in his *Libro dell'arte* (c.1400) under the rubric 'How to Make Paintings with Forms on Cloth'.⁶ Comprehensive series of ink recipes for stamping on fabric are transmitted in the *Nürnberg Kunstbuch*, compiled by the Dominican nun Klara Keiperin in Nuremberg in the second half of the fifteenth century,⁷ and *Trierer niederländisches Kunstbuch*, written in the Eastern Netherlands or Westphalia at the end of the fifteenth century.⁸ Along with ink recipes for stamping on leather and textile, they are also included in technical texts by the Swedish monk Peder Månsson collected mainly in Rome c.1508–24,⁹ and the *Colmarer Kunstbuch*, finished in 1478 by the monk Jacobus Haller in

Colmar.¹⁰ About forty scattered recipes are known in sixteen other fifteenth and sixteenth-century manuscripts from Germany and the Netherlands;¹¹ similar sources from other regions remain to be investigated.

The compilers were not necessarily professionals. Cennini was a painter, but his comprehensive treatise on all aspects of painting includes techniques he did not practice.¹² The *Nürnberg Kunstbuch* was written in the nunnery of St Catherine's in Nuremberg, where tapestry weaving is documented,¹³ but which was probably not a centre for textile and woodcut stamping, as was long believed.¹⁴ Månsson and the Tegernsee monk Wolfgang Sedelius were scholars with encyclopaedic interests.¹⁵ Nothing is known about the life of Jacobus Haller or the historic contexts of the other recipe collections. For this reason, and because most texts include stamping as one of many items in an encyclopaedic series of art technological instructions covering different fields of the *artes*,¹⁶ the information is often arbitrary and incomplete. The texts discuss the manufacture of the printing inks but rarely the preparation of the support or the process of

- 5 The importance of technical sources for the history of textile printing was recognised by Robert Forrer, who published and discussed for the first time the descriptions of Cennini and the *Nürnberg Kunstbuch*: R. Forrer, *Die Kunst des Zeugdrucks vom Mittelalter bis zur Empirezeit* (Strasbourg: Schlesier u. Schweikhardt, 1898), 11–22.
- 6 Cennino Cennini, *Il libro dell'arte*, ch. 173: Il modo di lavorare colla forma dipinti in panno; ed. F. Brunello, 2nd ed. (Vicenza: Pozza, 1997), 185–89.
- 7 Nuremberg, Stadtbibliothek, Ms. Cent. vi 8; fol. 12^r–19^r, ch. 35–48; E. Ploss, ed., *Ein Buch von alten Farben: Technologie der Textilfarben im Mittelalter mit einem Ausblick auf die festen Farben* (6th ed., Munich: Moos, 1989), 135–140; for the identification of the scribe, see K. Schneider, *Die Handschriften der Stadtbibliothek Nürnberg*, 2 vols. (Wiesbaden: Harrassowitz, 1965), 1: 239–40.
- 8 Trier, Stadtbibliothek, Hs. 8° 1028/1959: fol. 20^v, 27^r–27^v; W.L. Braekman, ed., 'Warenkennis, kleurbereidingen voor miniaturisten en vakkennis voor ambachtslui', *Koninklijke Academie voor Nederlandse Taal- en Letterkunde* 107 (1997), 121–54, nos. 25, 26, 37–47.
- 9 O. Johannsen, ed., *Peder Månssons Skrifter über technische Chemie und Hüttenwesen* (Berlin: VDI Verlag, 1941), 167–75.

- 10 Berne, Burgerbibliothek, Ms. Hist. Helv. XII: 308, 316–24; D. Oltrogge, ed., *Datenbank kunsttechnologischer Rezepte*, <http://www.re.fh-koeln.de/projekte/rezeptesammlung.htm>.
- 11 For a preliminary list of relevant manuscripts (with short titles), see Appendix 1. Another will be presented in D. Oltrogge, 'Item wildu ein papir trucken mit span grún', *Zeitschrift für Kunsttechnologie und Konservierung* 29 (forthcoming 2015).
- 12 F. Frezzato, 'Wege der Forschung zu Cennino Cennini: Von den biographischen Daten zur Bestimmung des *Libro dell'Arte*', W.-D. Löhr and S. Weppelmann, ed., *'Fantasie und Handwerk': Cennino Cennini und die Tradition der toskanischen Malerei von Giotto bis Lorenzo Monaco* (Munich: Hirmer, 2008), 133–39.
- 13 Ploss, *Buch von alten Farben*, 128.
- 14 P. Schmidt, *Gedruckte Bilder in handgeschriebenen Büchern: zum Gebrauch von Druckgraphik im 15. Jahrhundert* (Cologne: Böhlau, 2003), 84–86.
- 15 For Månsson see Johannsen, *Peder Månssons Skrifter*, 14–19; S.A. Mitchel, 'The Middle Ages', L.G. Warne, ed., *A History of Swedish Literature* (Lincoln: University of Nebraska Press, 1996), 1–57, esp. 50f.; for Sedelius see H. Pöhlein, *Wolfgang Seidel (1492–1562): Benediktiner aus Tegernsee, Prediger zu München: Sein Leben und sein Werk* (Munich: Karl Zink Verlag, 1951), 181–88.
- 16 On *artes* literature see B. D. Haage and W. Wegner, *Deutsche Fachliteratur der Artes in Mittelalter und Früher Neuzeit* (Berlin: Schmidt, 2007); on contexts of art technological recipes see M. Clarke, *Mediaeval Painters' Materials and Techniques: The Montpellier 'Liber diversarum artium'* (London: Archetype, 2011), 9–16 and D. Oltrogge, 'Der Liber illuministarum als kunsttechnologische Quellenschrift', A. Bartl, C. Krekel, M. Lautenschlager, D. Oltrogge, *Der 'Liber illuministarum' aus Kloster Tegernsee: Edition, Übersetzung und Kommentar der kunsttechnologischen Rezepte* (Stuttgart: Steiner, 2005), 28–48.

stamping, but all of these varied recipes are original and do not belong to common text traditions.¹⁷

The only known fifteenth-century mention of the preparation of a colour printing ink for paper is preserved not in *artes* manuscripts but in the personal papers of a book printer, Peter Drach from Speyer.¹⁸ Among records of book sales around 1486, he made a note about red ink prepared with vermilion for 'printing in missals or other books'.¹⁹ One could speculate that the printers of incunabula (or later chiaroscuro woodcuts) had a vested interest in *not* sharing their knowledge with a broader public.

Supports and Techniques

The main support for stamping mentioned in the recipes are textiles. The generic term 'cloth' (*tuch*) is sometimes used, but when the kind of fabric is specified, it is usually linen,²⁰ and rarely silk,²¹ wool,²² or cotton.²³ The fabric

could have been dyed; blue, red, green, yellow and black cloth is specifically mentioned.²⁴ The second most common support is leather,²⁵ and a unique recipe describes stamping on horn.²⁶ Printing or stamping on paper is mentioned only in two known sources; perhaps they were workshop secrets.

The technique always seems to be relief printing, even if few texts specify woodblocks.²⁷ Recipes focus on the preparation of the oil varnish and the tempering of the pigments or grounds for flock and metal-leaf prints (which actually seem to have been stamped), in which the freshly stamped area would be covered by sieved wool dust (*vlocken*, *scherwoll*, *scar wulle*, *wolle*) or metal leaf (*golt*, *silber*), respectively. The ground and shearings were normally of the same colour to strengthen the hue. However, Månsson, ch. 50–53, proposes sprinkling them on a cloth of a different colour to obtain a *changeant* effect using a transparent ground, and the same effect was probably intended in Göttingen, ch. III, 20.

Pigments

For 'autonomous' colour stamps and the grounds of flock prints, the same pigments could be used but cheaper materials were sometimes recommended for the latter. The most frequently mentioned colours are red and green, followed by blue. Only two recipes deal with yellow. Metal grounds also often contained pigments, usually red or

17 The sizing of the fabric is only described in the Nürnberger Kunstbuch, ch. 36 (ed. Ploss, 135), ÖNB 5206, fol. 54^r and Månsson, ch. 49 (ed. Johannsen, 172f.). The process of stamping fabric with the help of a frame and rubbing from the back is described by Cennini, ch. 173 (ed. Brunello, 186f.), CPG 183, fol. 291^r, ch. 60 (ed. Oltrogge, *Datenbank*) and Månsson, ch. 52 (ed. Johannsen, 173f.).

18 F. Geldner, 'Das Rechnungsbuch des Speyrer Druckherrn, Verlegers und Großbuchhändlers Peter Drach mit Einleitung, Erläuterungen und Identifizierungslisten', *Archiv für Geschichte des Buchwesens*, 5 (1964), 1–196, esp. 84. In comparison, a 1481 shopping list from the Florentine Ripoli monastery contains references to vermilion (*cinabro*) together with linseed oil, various resins and thin and strong oil varnish, which were presumably meant for red printing ink; V. Fineschi, *Notizie storiche sopra la stamperia di Ripoli* (Florence: Moücke, 1781), 49; Stijnman, 'Colours of Black', 63–64. Also, the Carthusian monks of the Freiburg Charterhouse sent a batch of vermilion pigment to Basle to have it ground to red ink for use with their own printing press; Petrus Thaler, vicar of the charterhouse, to Friedrich Textoris, 23 April 1508, in A. Hartmann, ed., *Die Amerbachkorrespondenz*, 10 vols. (Basle: Universitäts-Bibliothek, 1942–95), 1 (1481–1513): 472–73.

19 Dillingen, Studienbibliothek, xv 488, fol. 235^r; ed. Geldner, 'Rechnungsbuch', 84.

20 Cennini, ch. 173 (ed. Brunello, 185); *Colmarer Kunstbuch*, ch. 297 (ed. Oltrogge, *Datenbank*); Engelberg, fol. 103^r–04^r (ed. Woudhuysen-Keller, I, 176–179); Erlangen 457, fol. 283^v (ed. Ploss, 138); Månsson, ch. 49 (ed. Johannsen, 172f.); *Nürnberger Kunstbuch*, ch. 36 (ed. Ploss, 135); Vat. Pal. lat. 1272, fol. 83^r; Sedelius, fol. 327^r; ÖNB 5206, fol. 54^r (ed. Ploss, 137).

21 *Colmarer Kunstbuch*, ch. 297 (ed. Oltrogge, *Datenbank*); Sedelius, fol. 337^v.

22 *Colmarer Kunstbuch*, ch. 297 (ed. Oltrogge, *Datenbank*).

23 Engelberg, fol. 104^r (ed. Woudhuysen-Keller, I, 178f.).

24 Cennini ch. 173 (ed. Brunello, 188); CPG 211, fol. 39^v, ch. 10 (ed. Oltrogge, *Datenbank*); CPG 752, fol. 59^r; Månsson, ch. 53 (ed. Johannsen, 174f.); *Trierer niederländisches Kunstbuch*, fol. 27^v (ed. Braekman, no. 43–48).

25 *Colmarer Kunstbuch*, ch. 286, 298–307 (ed. Oltrogge, *Datenbank*); Göttingen, ch. III (ed. Seidensticker, 295); CPG 183, fol. 291^r (ed. Oltrogge, *Datenbank*); Månsson, ch. 24, 26 (ed. Johannsen, 167–69).

26 CPG 558, fol. 151^r (ed. Oltrogge, *Datenbank*).

27 The cutting of the woodblock is described by Cennini, ch. 173 (ed. Brunello, 185); the *Nürnberger Kunstbuch*, ch. 35 (ed. Ploss, 135), and Månsson, ch. 48 (ed. Johannsen, 172). The *Colmarer Kunstbuch*, ch. 311 (ed. Oltrogge, *Datenbank*), adds that it should be soaked with oil before use. Erlangen, fol. 283 (ed. Ploss, 138), Göttingen, ch. III, 1 and 20 (ed. Seidensticker, 295, 298); CPG 183, ch. 68 (ed. Oltrogge, *Datenbank*); CPG 752, fol. 58^r; Leyden, fol. 144^r; Sedelius, fol. 339^r; *Trierer niederländisches Kunstbuch*, ch. 26 (ed. Braekman, 134); Vat. Pal. lat. 1220, fol. 83^r and ÖNB 5206, fol. 54^r only discuss its use. The common High German name for the block is *form* (*furm*), Italian *forma*, in Netherlandish (Leyden, *Trierer niederländisches Kunstbuch*, Vat. Pal. lat. 1220) it is *printe*, *prente* and in Low German (Göttingen) *stock*.

yellow ochre for gold grounds and lead white for silver (Table 4.6).

For red, two pigments were preferred: vermilion and red lead, separate or mixed (Table 4.1). Vermilion was used by Peter Drach for printing rubrics in incunabula.²⁸ The *Nürnberg Kunstbuch* proposes either vermilion or the cheaper alternative of burnt (red) ochre and red lead for colour stamping,²⁹ and only the less expensive mixture for flock prints.³⁰ Organic reds give different hues: 'blood red' (*sag win*, i.e. *sanguin*) from brazilwood dye and safflower carmine;³¹ 'dark purplish red' (*brun rot*) from vermilion mixed with Paris red (*parisrot*, a red lake from scale insects, scarlet wool shearings or brazilwood),³² or simply Paris red.³³ Recipes for red flock grounds mainly involve cheaper pigments because the ink was covered by the wool shearings, whose colour it intensified. Iron oxides (burnt ochre, red earth, yellow ochre, red bole), sometimes with red lead, are common (Table 4.1). Only Sedelius proposed the use of 'kettle brown' (*kesslpraun*),³⁴ presumably iron oxides from corroded iron pans,³⁵ or copper hammer scale (a mixture of red and black copper oxides).³⁶

For both purposes, the green is usually verdigris (*spangrün*) (Table 4.2). The term generally designates artificial green copper pigments, including copper acetate, copper chloride, copper tartrate and copper carbonate. All of these copper green pigments have different hues and vary in opacity in oil media, so printers would have chosen specific pigments. 'Mountain green' (*Berggrün*), a mineral copper green, is mentioned twice;³⁷ analysis of contemporary paintings proves that several mineral green copper pigments were on the market, including malachite and



FIGURE 4.1 *Furnishing Fabric (Ogival compartments with flowers, velvet pattern), France (?), 1550–1599, linen fabric stamped in dark brown and red brown, with crushed mica*
LONDON, VICTORIA & ALBERT MUSEUM, 1546–1899;
© VICTORIA AND ALBERT MUSEUM, LONDON

copper sulphates like posnjakite and brochantite, which could not be distinguished at the time.³⁸ Most recipes recommend adding 'lead yellow' (*pley gel*), which usually means lead tin yellow, to strengthen the opacity of copper acetate, endow copper green pigments with a warmer hue and expedite drying (Table 4.2). The addition of sap green proposed in the *Trierer niederländisches Kunstbuch* would produce further varieties of green hues.³⁹

The common blue for colour stamping and flock grounds was mixed from indigo and lead white (Table 4.3). 'Woad flower' (*wayd plum*) is an indigo pigment that was skimmed off the top of the woad vat as foam. This dyers' indigo was probably cheaper than imported indigo; remarkably, it is mentioned only in a recipe for a flock ground.⁴⁰ Lead white is a drier and gives body and opacity to the indigo. Instead of lead white, the *Colmarer*

28 See note 18 above.

29 *Nürnberg Kunstbuch*, ch. 38 (ed. Ploss, 136).

30 *Ibid.*, ch. 45 (ed. Ploss, 137f.).

31 *Colmarer Kunstbuch*, ch. 304 (ed. Oltrogge, Datenbank).

32 CPG 211, fol. 39^v, ch. 11 (ed. Oltrogge, Datenbank). For Paris red see J. Kirby, D. Saunders and M. Spring, 'Proscribed Pigments in Northern European Renaissance Paintings', in D. Saunders, J.H. Townsend and S. Woodcock, ed., *The Object in Context: Crossing Conservation Boundaries: Contributions to the Munich Congress 28 August–1 September 2006* (London: IIC, 2006), 236–43.

33 Göttingen, ch. III, 10 and 12 (ed. Seidensticker, 296).

34 Sedelius, fol. 338^v–39^r.

35 G. Heydenreich, 'The Leipzig Trade Fairs as A Market for Painters' Materials in the Sixteenth Century', J. Kirby, S. Nash and J. Cannon, ed., *Trade in Artists' Materials: Markets and Commerce in Europe to 1700* (London: Archetype, 2010), 297–313, esp. p. 309.

36 U. Haller, 'Administrator of Painting': The Purchase- and Distribution-Book of Wolf Pronner (1586–1590) as a Source for the History of Painting Materials'; *Ibid.*, 325–35, esp. p. 333f.

37 Sedelius, fol. 339; *Trierer niederländisches Kunstbuch*, ch. 41 (ed. Braekman, 139).

38 A. Burmester and L. Resenberg, 'Von Berggrün, Schiefergrün und Steingrün aus Ungarn', *Restaura* 109 (2003), 180–87.

39 *Trierer niederländisches Kunstbuch*, ch. 41 (ed. Braekman, 139).

40 CPG 620, fol. 104, ch. 45 (ed. Oltrogge, Datenbank).

Kunstbuch recommends mixing *bergheiterblo* with indigo for stamping on leather.⁴¹ The unique term probably means light (*heiter*) mountain blue (*Bergblau*), i.e. azurite. This expensive pigment is perhaps also the *lasur* ('blue') mentioned in Göttingen,⁴² and as an alternative to indigo in Cpg. 211.⁴³ Azurite produces opaque prints with some body; the tint varies from light to deep blue depending on the quality of the mineral pigment and the proportion of indigo in mixtures.

Only Göttingen and Munich, cgm. 822 contain recipes for yellow inks with lead tin yellow (*blygeel*, *pligel*) (Table 4.4). White ink was made with lead white and grey with lead white and black, commonly lamp black or charcoal and rarely 'pit-coal' (*steynkolen*),⁴⁴ or 'black earth' (*erdschwartz*, pit- or brown coal?)⁴⁵ (Table 4.5). Sometimes a little verdigris, red lead or alum was added to black and grey printing inks as driers, as stated explicitly in cgm. 822,⁴⁶ and in the Engelberg,⁴⁷ and the Göttingen manuscripts.⁴⁸ Depending on the amount of the green and red pigments, they could also function as 'toners', giving the black a cooler or warmer cast. The Göttingen manuscript recommends preparing brown (*brun*) by adding red lead to the black pigment.⁴⁹

Binding Media

The most important binding medium for printing ink is 'varnish' (*virnis*), which normally indicates an oil-resin varnish but can also signify a resin, an oil or an aqueous varnish (Tables 4.1–4.5).⁵⁰ Linseed oil is standard; hemp oil is recommended only in the *Colmarer Kunstbuch* for stamping leather.⁵¹ In Engelberg *bom öl* is mentioned as an alternative to linseed oil,⁵² and *boum oley* without the addition of a resin is the medium in Cpg. 211.⁵³ *Baumöl* is the early modern High German name for 'olive oil',⁵⁴

which cannot be meant in the recipes because it is non-drying and therefore unsuitable for printing. The term may refer to *baumnuss* (walnut) oil, which is a drying oil. The main variation between the recipes for oil-resin varnishes is the use of different resins: amber, mastic, colophony, turpentine and white pitch (an opaque, hydrous conifer resin). An oil varnish prepared from linseed oil only boiled with driers (like red lead, alum or verdigris) and other additives (like chalk) is sometimes mentioned.⁵⁵ Driers could be added, but several pigments (e.g. lead pigments) promoted drying themselves. The addition of lead white to indigo in blue impressions and of red lead to red iron oxide flock grounds would propel the drying of the ink.

The 'varnish' is not always explained, but it presumably means pure linseed oil or oil-resin varnish because pure resin varnishes are not suitable for stamping or printing.⁵⁶ Occasionally aqueous media are proposed: egg white for lead white ink,⁵⁷ vermilion and *parisrot*,⁵⁸ and egg white and gum arabic for *lazur*.⁵⁹

The same medium is usually used for all colours. Variations are rare; the *Colmarer Kunstbuch* calls for adding drops of egg yolk to vermilion and red lead, which facilitates the tempering of the pigments with the oil-resin varnish.⁶⁰ For the same reason Peter Drach ground vermilion with egg white before adding the varnish.⁶¹ Specific varnishes are rarely proposed for certain purposes, but the *Nürnberger Kunstbuch* recommends amber-linseed oil varnish tempered with linseed oil for colour inks and amber-linseed oil varnish mixed with mastic for flock prints.⁶² Cpg. 558 recommends a similar mixture for black ink for stamping on fabric but a linseed oil varnish for black *auftrucken* on paper.⁶³ Drach's 'painters' varnish' (*fjirniß so die maller bruchen*) for his vermilion typographic ink for rubrics in incunabula may be a pure oil varnish.⁶⁴

41 Ch. 302 (ed. Oltrogge, Datenbank).

42 Ch. III, 1 (ed. Seidensticker, 295).

43 Fol. 39^v, ch. 13 (ed. Oltrogge, Datenbank).

44 *Trierer niederländisches Kunstbuch*, ch. 37 (ed. Braekman, 138).

45 Sedelius, fol. 327^r.

46 Fol. 105^r.

47 Fol. 103^v (ed. Woudhuysen-Keller, 176f.).

48 Ch. III, 14 (ed. Seidensticker, 297).

49 Ch. III, 17 (ed. Seidensticker, 297).

50 Bartl et al., *Liber illuministarum*, 693.

51 Ch. 300 (ed. Oltrogge, Datenbank); it is not clear from the recipe if this varnish was also used for printing fabric.

52 Fol. 103^r (ed. Woudhuysen-Keller, 176f.).

53 Fol. 39^v, ch. 11 (ed. Oltrogge, Datenbank).

54 O. Reichmann, A. Lobenstein-Reichmann and U. Goebel, *Frühneuhochdeutsches Wörterbuch*, 3 (Berlin: de Gruyter, 3, 2002), s.v.

55 CPG 558, fol. 148^v, ch. 24 (ed. Oltrogge, Datenbank); Månsson, ch. 24 (ed. Johannsen, 167); CPG 752, fol. 59^r.

56 I would like to thank my students F. Bartzok, L. Deutmann, V. Ebel, K. Engelmann, C. Huber, A. Keruzec, G. Klaffke, I. Klotz, J. Kourgierakis, T. Niepold, M. Piecuch, C. Rosse, S. Schüppen and S. Staab for their enthusiasm for 'reconstructing' stamping recipes.

57 Berleburg, fol. 217^r (ed. Dressendorfer et al., facsimile).

58 Göttingen, ch. III, 8 and 10 (ed. Seidensticker, 296).

59 Göttingen, ch. III, 1 (ed. Seidensticker, 295).

60 Ch. 303, 304 (ed. Oltrogge, Datenbank).

61 Geldner, 'Rechnungsbuch', 84.

62 Ch. 45 (flock prints), ch. 48 (colour stamping), ed. Ploss, 137f, 139f.

63 Fol. 149^v, ch. 26 and 27 (ed. Oltrogge, Datenbank). The term and description are not specific enough to indicate whether the recipe is intended for stamping or printing; see note 4.

64 Geldner, 'Rechnungsbuch', 84.

Experiments show that most of the recipes for inks with oil-resin varnishes could be used on different supports, namely paper, textile and leather. However, the medium plays an important role for the quality and appearance of the print, especially in the opacity and brightness of the colours. It is significant that the recipes are very similar in their choice of pigments but vary considerably in the composition of the binding media. Whereas modern visual examination of these objects necessarily focuses on the resulting *colours* (which are affected by the pigment, the medium and changes over time), the *medium* and the tempering of the pigment was the main concern of the printers. Both influence the quality of the impression. Therefore it is not surprising that Drach paid much attention to the purification and grinding of the vermilion.

Workshop Practice: Recipes vs. Surviving Examples

The number of surviving recipes for stamping fabric corresponds with the popularity of this technique. A number of fourteenth to sixteenth-century colour and flock prints on fabric survive.⁶⁵ They were often intended as cheaper substitutes for brocades⁶⁶ (the tracing of brocade models is described in the *Nürnberger Kunstbuch*) (Fig. 4.1),⁶⁷ and narrative prints imitated woven narrative tapestries.⁶⁸ Fifteenth and sixteenth-century examples of colour stamping on leather also survive.⁶⁹

The analysis of extant textile colour prints shows similarities with the technical sources.⁷⁰ The 'Sion Tapestry', a

block-printed textile with images in black surrounded by borders in red that was produced in northern Italy in the late fourteenth century, was stamped with vermilion and lamp black inks (Fig. 4.2).⁷¹ The use of expensive vermilion accords with the prestigious character of this narrative tapestry. Analysis revealed inferior red pigments on some fifteenth-century German stamped textiles (Fig. 4.3): the vermilion on one was adulterated with a red lake, which was precipitated on a chalk or gypsum substrate, and the red ochre on a linen cloth was even cheaper.⁷² As



FIGURE 4.2 *Detail of the Finding of Oedipus in the 'Sion' tapestry, Northern Italy, fourteenth century, linen fabric stamped in black and red*
BASEL, HISTORISCHES MUSEUM, 1897.48; © HMB – HISTORISCHES MUSEUM BASEL, PHOTO: M. BABEY



FIGURE 4.3 *'Holy Head' no. 30, end of the fifteenth century, linen fabric with red stamping*
ROERMOND (NETHERLANDS), ABBEY CHURCH; © CICS, FOTO A. STAUFFER

65 L. von Wilckens, 'Der spätmittelalterliche Zeugdruck nördlich der Alpen', *Anzeiger des Germanischen Nationalmuseums* (1983), 7–18. A comprehensive study of all extant textile prints to distinguish mediaeval prints from nineteenth-century forgeries is still needed.

66 J. Zander-Seidel, "So wirt es gut vnd erhaben, gleich als der sammet": Textile Gewebeimitationen des späten Mittelalters und der frühen Neuzeit, *Anzeiger des Germanischen Nationalmuseums* (1995), 216–27. A splendid example for 'brocade' printing is the chasuble for the Fischeraltar in the St. Nicolai church in Rostock, now in the Kulturhistorisches Museum, Rostock; *Ibid.*, fig. 10.

67 Ch. 35 (ed. Ploss, 135).

68 Von Wilckens, 'Zeugdruck'; *Ibid.*, *Die textilen Künste: Von der Spätantike bis um 1500* (Munich: Beck, 1991), 161–72.

69 Von Wilckens, 'Zeugdruck', 14–15.

70 Only some textile prints from the fifteenth and sixteenth centuries have been analysed and very few analyses have been published. Many 'mediaeval' prints have been identified as nineteenth-century products, D. King, 'Textiles and the Origin of Printing in Europe', *Pantheon* 20 (1962), 23–30.

71 Basel, Historisches Museum, 1897.48; Parshall et al., *Origins*, 62–68, no. 2.

72 Cologne, Museum Schnütgen, Inv. N 90 and N 40; A. Lienemann, *Untersuchungen zur Technologie des spätmittelalterlichen Zeugdruckes: Die Anweisungen des 'Nürnberger Kunstbuches' im*

recommended in the sources, the red pigments in the grounds of two mid-fifteenth century flock prints are iron oxides mixed with red lead as a drier.⁷³ The medium for colour stamps and flock grounds has always proved to be linseed oil (without resin additives), but the number of analyses is too small to draw definite conclusions.

The few extant colour stamps on leather have not yet been investigated in detail.⁷⁴ Some are stamped on leather as described in the recipes.⁷⁵ However, Johannes Richenbach, active as chaplain and bookbinder in Geislingen 1463–86, experimentally combined three-dimensional blind tooling with colour tooling in red, blue and green.⁷⁶ He probably embossed the leather with a tool (a metal stamp, usually brass, into which the design is cut; it is warmed and pressed into the leather) and then impressed the colour with the same tool. A similar process using gold leaf is still practiced for gold tooling.

Generally the pigments recommended in the sources for textile and leather stamping were also suitable for printing on paper with a press. The little published technical

examination indicates that some, but not all, fifteenth- and early sixteenth-century colour printing inks did not follow known recipes. For example, impressions of an engraving by Master E.S., *Virgin and Child* (Upper Rhine, Strasbourg?, c.1465–67; Stijnman, Fig. 3.1), were printed with lead white and the unique colour impression of an engraving by Agostino Veneziano, *Virgin and Child* (Rome, c.1525?), involves vermilion with a little red iron oxide for red and probably indigo or woad for blue.⁷⁷ Some colour printing inks do not appear in the known recipes, including the mixture of yellow ochre and perhaps woad (to make green) in two engravings by Mantegna, *Battle of Satyrs Riding Seahorses with an Old Woman (Invidia)* and *Mary with a Child in a Cave* (Mantua, c.1470–80).⁷⁸

Conclusion

Whereas modern art-historical interest in early colour printing focuses on prints on paper (in books or as single sheets), the contemporary public would have been more acquainted with colour stamping on fabric, perhaps also on leather. They are well documented in early art technological sources, unlike colour printing on paper and/or with a printing press. They describe a restricted palette for 'autonomous' prints and flock prints, with a predilection for reds, and grounds for gold and silver. The choice of pigments was limited, and recipes give more attention to the oil medium, for which many variations are found. Oil-resin or pure oil varnishes are usually mentioned, and analysis shows that oil varnishes were used on textiles. Aqueous media, which were occasionally proposed, have been detected in block prints on paper.⁷⁹ So far, analyses show that the pigments of textile prints and some relief and intaglio prints on paper match the information given by the sources. There could have been no standard methods for stamping in colour so early in the history of this technique, but the attested experimental approaches are consistent in many ways. It is hoped that research will be undertaken into the constituents of the earliest colour printing inks so that their pigments and binding media can be compared to those associated with earlier and contemporary colour stamping and with later colour printing, whether attested in surviving objects or mentioned in art technological sources.

Vergleich mit ausgewählten Druckstoffen (dipl. thesis, Fachhochschule Cologne, 1994), 153.

73 Cologne, Museum Schnütgen, N 234; haematite, goethite and red lead were analysed with XRD; Lienemann, *Untersuchungen*, 143, 154f. The analysis of another fragment of the cloth (Aachen, Suermond Ludwig Museum, SB 0298) detected linseed oil in the binding medium; A. Krippendorf, *Die Flocktechnik: Quellenstudium und Objektuntersuchungen mit dem Schwerpunkt beflockter Textilien* (dipl. thesis, Fachhochschule Cologne, 2002), 62. Red ochre with linseed oil and lead pigment was found in the flock print Nuremberg, Germanisches Nationalmuseum, Gew. 1169; Krippendorf, *Flocktechnik*, 64. The five known flock prints on paper have not been analysed or gave no results; A. Scheld and R. Damm, 'Flock Prints and Paste Prints: A Technological Approach', in Parshall, *Woodcut*, 317–36. See A. Uhr, 'Colour-Printed Pastepoints', this volume, 76–81.

74 A comprehensive catalogue of surviving stamped leather objects is still needed. The published examples are book bindings, e.g. Munich, Bayerisches Nationalmuseum Hs. 3803 (Sulzbach, first half of the fifteenth century, see F. Geldner, 'Mittelalterliche Einbandseltenheiten', *Archiv für Geschichte des Buchwesens* 9 (1969), 373–400, esp. 374–78, fig. 2; Hamburg, State and University Library, Ms. Theol. 1097 (Suebia, fifteenth century), see von Wilckens, *Zeugdruck*, 14, fig. 19.

75 See the examples in von Wilckens, *Zeugdruck*, 14–15.

76 M. von Arnim, *Europäische Einbandkunst aus sechs Jahrhunderten: Beispiele aus der Bibliothek Otto Schäfer Schweinfurt*, exh. cat. (Schweinfurt: Schäfer, 1992), 10. D. Hakelberg, 'Ein Bucheinband von Johannes Richenbach für Conrad Schuoler', *Einbandforschung: Informationsblatt des Arbeitskreises für die Erfassung, Erschließung und Erhaltung historischer Bucheinbände* 18 (2008), 37–41. The pigments of Richenbach's bindings have not yet been analysed.

77 Stijnman, *Engraving and Etching*, 276–78. For the analysis of printing inks in incunabula and block prints, see notes 1 and 2.

78 Ibid., 278. For current scientific on chiaroscuro inks, see B. Price et al., 'A Technical Study', this volume, 140–50.

79 Stijnman, 'Colours of Black', p. 67.

The following tables give constituents for colour printing inks on fabric supports unless otherwise indicated.

TABLE 4.1 *Red Colour Prints and Flock Ground*

Source	Ink		Flock Ground	
	Colourant	Binding Medium	Source	Colourant
CENNINI, CH. 173	vermilion	liquid varnish		
CENNINI, CH. 173	red lead	liquid varnish		
CGM. 720, FOL. 228 ^v , CH. 40	red lead	varnish		
CGM. 822, FOL. 105 ^r	vermilion + red lead	varnish		
CKB, CH. 303	red lead + vermilion (2:1)	varnish (hemp oil boiled with mastic) + 2 drops egg yolk		
CKB, CH. 304 (SAG WIN)	brasil dye + safflower carmines	varnish (hemp oil boiled with mastic) + 2 drops egg yolk?		
CPG. 211 FOL. 39 ^v , CH 11 (BRUNROT)	vermilion + <i>parisrot</i> (1:1)	<i>boum oley</i> (olive oil or walnut oil?)		
CPG. 558 FOL. 149 ^v , CH. 29	red lead	oil-amber varnish		
CPG. 620 FOL. 104 ^v , CH. 48			red earth	linseed oil + varnish
CPG. 752 FOL. 59 ^r	vermilion	linseed oil boiled with chalk + red lead + alum		
CPG. 752 FOL. 59 ^r	red lead	linseed oil boiled with chalk + red lead + alum		
CPL, FOL. 82 ^r –83 ^r			bole + ochre + red lead	varnish (boiled linseed oil + vitriol + incense + gum arabic) + mastic + colophonium
DRACH	vermilion	egg white/varnish		
ENGELBERG, FOL. 103 ^v	red lead + vermilion (2:1)	linseed oil or <i>bom öl</i> (olive oil or walnut oil?) + white pitch		
ERLANGEN, FOL. 283 ^v	red lead + vermilion (6:1)	varnish		
GÖTTINGEN, CH. III, 5	vermilion	linseed oil + varnish		
GÖTTINGEN, CH. III, 8	vermilion	egg white		
GÖTTINGEN, CH. III, 10	<i>parisrot</i>	egg white		
GÖTTINGEN, CH. III, 12	<i>parisrot</i>	linseed oil + varnish		
GÖTTINGEN, CH. III, 20				varnish (uncoloured)
GRAZ, FOL. 54 ^r (ON PAPER)	red lead			
GRAZ, FOL. 4 ^v (ON TEXTILE)	red lead or red ochre			
LEYDEN, FOL. 144 ^r			Armenian bole + red lead	varnish + colophony
MÄNSSON CH. 52			(red lead as drier, not enough to also act as a colourant)	linseed oil + glass + colophony + red lead
NKB, CH. 38	vermilion	linseed oil (+ amber-linseed oil-varnish?)		
NKB, CH. 45	burnt (red) ochre + red lead (1:1)	linseed oil (+ amber-linseed oil-varnish)	red lead + burnt (red) ochre (3:1)	mastic + amber-linseed oil-varnish
SEDELIUS, FOL. 338 ^v –339 ^r			<i>kesslpraun</i>	varnish + mastic + turpentine
SEDELIUS, FOL. 339 ^r			red earth	linseed oil + varnish
TNK, CH. 25			bole + red lead	varnish + turpentine
TNK, CH. 26			bole + ochre + red lead + red earth	varnish + turpentine

TABLE 4.2 *Green Colour Prints and Flock Ground*

Source	Ink		Flock Ground	
	Colourant	Binding Medium	Source	Colourant
CGM. 822, FOL. 105 ^r	‘verdigris’ + lead (tin) yellow + sap green	varnish + (2 drops) egg yolk		
CKB, CH. 305	‘verdigris’ + lead (tin) yellow	varnish (hemp oil boiled with mastic)		
CPG. 211, FOL. 39 ^v , CH. 11	‘verdigris’ + lead (tin) yellow	<i>boum oley</i> (olive oil or walnut oil?)		
CPG. 558, FOL. 149 ^v , CH. 25	verdigris	mastic		
CPG. 620, FOL. 104, CH. 46			‘verdigris’ + lead (tin) yellow	linseed oil + varnish
CPG. 752, FOL. 59 ^r	‘verdigris’ + lead (tin) yellow	linseed oil boiled with chalk + red lead + alum		
ENGELBERG, FOL. 104 ^r	‘verdigris’ + lead white	linseed oil or <i>bom öl</i> (olive oil or walnut oil?) + white pitch		
ERLANGEN, FOL. 283 ^v	‘verdigris’ + lead (tin) yellow	varnish		
GRAZ, FOL. 54 ^r (ON PAPER)	‘verdigris’			
GRAZ, FOL. 54 ^v (ON TEXTILE)	‘verdigris’ + saffron			
MÅNSSON, CH. 26	‘verdigris’	varnish + linseed oil		
NKB, CH. 40	‘verdigris’ + lead (tin) yellow	linseed oil (+ amber- linseed oil-varnish?)	‘verdigris’ + lead (tin) yellow	mastic + amber-linseed oil-varnish
SEDELIUS, FOL. 339 ^r			‘mountain green’ (mineral copper green)	varnish + mastic + turpentine
TNK, CH. 40	‘verdigris’ + lead (tin) yellow	varnish		
TNK, CH. 41	‘mountain green’ (mineral copper green) + lead (tin) yellow + sap green	varnish		

TABLE 4.3 *Blue Colour Prints and Flock Ground*

Source	Ink		Flock Ground	
	Colourant	Binding Medium	Colourant	Binding Medium
CENNINI, CH. 173	indigo + lead white	liquid varnish		
CKB, CH. 302	indigo + <i>berg heiterblau</i> (light azurite?)	varnish (hemp oil boiled with mastic)		
CPG. 211, FOL. 39 ^v , CH. 13	indigo + lead white	?		
CPG. 211, FOL. 39 ^v , CH. 13	<i>lasur</i> (azurite?) + lead white	?		
CPG. 558, FOL. 149, CH. 22	indigo + lead white	mastic		
CPG. 620, FOL. 104, CH. 45			<i>wayd plum</i> (woad) + lead white	linseed oil + varnish
GÖTTINGEN, CH. III, 1	<i>lazur</i> (azurite?)	egg white + gum arabic		
GRAZ, FOL. 54 ^r (ON PAPER)	blueberry or dwarf elder blue			
NKB, CH. 41	indigo + lead white	linseed oil + amber- linseed oil-varnish		
NKB, CH. 46			indigo + lead white	mastic + amber-linseed oil-varnish

TABLE 4.4 *Yellow Colour Prints*

Source	Ink		Flock Ground	
	Colourant	Binding Medium	Colourant	Binding Medium
CGM. 822, FOL. 105 ^r	lead (tin) yellow	varnish		
GÖTTINGEN, CH. III, 5; 13	lead (tin) yellow	linseed oil + varnish		
GÖTTINGEN, CH. III, 11	yellow (lead tin yellow?)	egg white		
GRAZ, FOL. 54 ^v (ON TEXTILE)	yellow ochre or orpiment or saffron			

TABLE 4.5 *White, Grey and Black Prints*

Source	Ink			Binding Medium
	White	Gray	Black	
BERLEBURG, FOL. 217 ^r	lead white			egg white
CENNINI, CH. 173	lead white			liquid varnish
CENNINI, CH. 173			vine black	liquid varnish
CGM. 822, FOL. 105 ^r			lamp black	varnish + little red lead or verdigris
CKB, CH. 306		black + lead white (1/2) + red lead (1/6)		varnish (hemp oil boiled with mastic)
CKB, CH. 307			lamp black or chimney soot	varnish (hemp oil boiled with mastic)
CPG. 211, FOL. 39 ^v , CH. 10		black + lead white		not mentioned
CPG. 558, FOL. 148 ^v , CH. 14	lead white			linseed oil
CPG. 558, FOL. 149 ^r , CH. 24	lead white			mastic + linseed oil?
CPG. 558, FOL. 149 ^v , CH. 26			lamp black or pine soot + red lead (1/16)	mastic + varnish (amber-linseed oil-varnish?)
CPG. 558, FOL. 149 ^v , CH. 27 (on paper)			lamp black or pine soot + red lead (1/16)	linseed oil
CPG. 620, FOL. 104, CH. 44			lamp black	linseed oil + varnish
CPG. 620, FOL. 104 ^{r/v} , CH. 47		black + lead white		linseed oil + varnish
CPG. 752, FOL. 59 ^r		<i>black dyed support</i> : pine soot or soot + lead white		linseed oil boiled with chalk + red lead + alum + burnt sheep bones
ENGELBERG, FOL. 103 ^{r/v}			black colour + verdigris + red lead	linseed oil or <i>bom öl</i> (olive oil or walnut oil?) + white pitch
ENGELBERG, FOL. 104 ^r	lead white			linseed oil or <i>bom öl</i> (olive oil or walnut oil?) + white pitch
GÖTTINGEN, CH. III, 4; 14–15			lamp black or pine soot (ch. 4) or beech charcoal (ch. 14/15)	varnish + linseed oil + (a little) verdigris or alum
GÖTTINGEN, CH. III, 16			black	egg white + honey
GÖTTINGEN, CH. III, 13	lead white			varnish + linseed oil
GÖTTINGEN, CH. III, 17			brown (<i>brun</i>): black + red lead	varnish + linseed oil + (a little) verdigris or alum
GRAZ, FOL. 54 ^v			charcoal from burnt straw	
LEYDEN, FOL. 144 ^v –145 ^r			lamp black + <i>swerter erde</i> ?	varnish (varnish + colophony)? + linseed oil
LEYDEN, FOL. 145 ^r (ON PAPER OR PARCHMENT)			lamp black	linseed oil
MÄNSSON, CH. 24			lamp black	linseed oil
NKB, CH. 42	lead white + (very little) pine soot			linseed oil + amber-linseed oil-varnish
NKB, CH. 43			lamp black or pine soot	linseed oil + amber-linseed oil-varnish
SEDELIUS, FOL. 327 ^r			earth black (<i>erdschwartz</i>)	linseed oil + varnish + egg white
SEDELIUS, FOL. 338 ^r			birch charcoal	linseed oil + varnish + turpentine (? <i>largat</i>) + (a little) red lead
TNK, CH. 37			pit-coal + (a little) verdigris + (a little) red lead	varnish
TNK, CH. 38		lead white + black		varnish
TNK, CH. 39	lead white			light varnish

TABLE 4.6 *Metal-Leaf Prints*

Source	Gold print		Silver print	
	Ground	Binding Medium	Ground	Binding Medium
CKB, CH. 286 (ON LEATHER OR FABRIC)	red burnt ochre (1 part) + armenian bole (a little) + chalk (1/2 part) + red lead (a little)	linseed oil + varnish (hemp oil mastic varnish?)		
CKB, CH. 297	burnt ochre + armenian bole + red lead + turpentine	linseed oil + varnish (hemp oil mastic varnish?)	like gold?	
CKB, CH. 298/299 (ON LEATHER)	burnt ochre + armenian bole + turpentine	hemp oil boiled with mastic	chalk + armenian bole + turpentine	hemp oil boiled with mastic
CPG. 183, FOL. 291 ^r , CH. 68	yellow ochre	varnish	lead white	varnish
CPG. 211, FOL. 39 ^v , CH. 12		varnish + mastic		
CPG. 558, FOL. 149, CH. 20/21	lead white + lead yellow	linseed oil + mastic + varnish (amber linseed oil varnish?)	lead white	mastic
CPG. 752, FOL. 58 ^{r/v}	armenian bole	varnish of the bow makers + mastic + turpentine	like gold	
ERLANGEN, FOL. 283 ^v	lead white + red earth	varnish + mastic + gum serapin	like gold	
GÖTTINGEN, CH. III, 2 (ON LEATHER OR FABRIC)	yellow ochre + saffron + chalk	gum arabic + egg white	like gold	
GÖTTINGEN, CH. III, 3 (ON LEATHER OR FABRIC)	armenian bole	gum arabic + egg white		
GÖTTINGEN, CH. III, 21		varnish + oil or varnish	like gold	
LEYDEN, FOL. 143 ^v		honey + bone white		
ÖNB, FOL. 54 ^r		oil + glass		
NKB, CH. 37	lead white + yellow ochre	mastic + varnish (or turpentine)	lead white	mastic + varnish (or turpentine)
SEDELIUS, FOL. 337 ^{r/v}	lead white	mastic + gum arabic + glue + turpentine (? <i>largat</i>)	like gold	
SEDELIUS, FOL. 337 ^v (ON SILK)		varnish + mastic + turpentine (? <i>largat</i>) + aloe + sugar		
SEDELIUS, FOL. 337 ^v		varnish		
SEDELIUS, FOL. 337 ^v –338 ^r	armenian bole + copper red	varnish		
TNK, CH. 42	lead white + verdigris (a little) + lead yellow (a little)			

Key:

BERLEBURG	Berleburg, Fürstl. Sayn-Wittgenstein'sche Schlossbibliothek RT 2/6	ENGELBERG	Engelberg, Stiftsbibliothek, Cod. 431
CENNINI	Cennino Cennini, <i>Il libro dell'arte</i>	ERLANGEN	Erlangen, University Library, Cod. 457
CGM.	München, Bayerische Staatsbibliothek, cgm. (various manuscripts)	GÖTTINGEN	Göttingen, University Library, Cod. Hist. nat. 51
CKB	<i>Colmarer Kunstbuch</i> , Berne, Burgerbibliothek, Ms. Hist. Helv. XII	GRAZ	Graz, University Library, Ms. 1000
CPG.	Heidelberg, University Library, Cod. pal. germ. (various manuscripts)	LEYDEN	University Library, Codex Vossius Chymicus Octavo 6
CPL.	Rome, Biblioteca Apostolica Vaticana, Cod. Pal. lat. 1272	MÄNSSON	Peder Månsson
DRACH	Peter Drach, Account Book; Dillingen, Studienbibliothek xv 488	NKB	<i>Nürnberger Kunstbuch</i> , Nuremberg, Stadtbibliothek, Ms. Cent. vi 89
		SEDELIUS	Wolfgang Sedelius, Kunstbuch, Munich, Bayerische Staatsbibliothek, cgm. 417
		TNK	<i>Trierer niederländisches Kunstbuch</i> , Trier, Stadtbibliothek, Hs. 8° 1028/1959

Appendix 1: Preliminary List of Manuscripts with Recipes for Colour 'Printing' Ink, in Approximate Chronological Order

Bavaria, fourteenth century. Nuremberg, Germanisches Nationalmuseum, Hs. 3227a: fol. 75^r (GNM 3227a).⁸⁰

Cennino Cennini, Padova, c. 1400. *Il libro dell'arte*: ch. 173 (Cennini).⁸¹

Heilsbronn, c.1439–43. Erlangen, University Library, Cod. 457: fol. 283^v (Erlangen).⁸²

Austria?, mid-fifteenth century. Vienna, Österreichische Nationalbibliothek, Cod. 5206: fol. 54^{r/v} (ÖNB 5206).⁸³

Bavaria? mid-fifteenth century? Graz, University Library, Ms. 1000 (Graz).⁸⁴

England, fifteenth century. Oxford, Bodleian Library MS Rawlinson C.288, f. 108^v (later infill).⁸⁵

Southern Germany, second half of fifteenth century. Heidelberg, University Library, Cpg. 620: fol. 104^r–05^r (CPG 620).⁸⁶

Klara Keiperin, Nuremberg St. Catherine's, second half of the fifteenth century. Nuremberg, Stadtbibliothek, Ms. Cent. vi 8: fol. 12^r–19^r, ch. 35–48 (*Nürnberger Kunstbuch*).⁸⁷

Northern Bavaria, c.1470–85. Heidelberg, University Library, Cpg. 558: fol. 148^v–150^r (CPG 558).⁸⁸

Mainz?, c.1475. Bad Berleburg, Fürstl. Sayn-Wittgenstein'sche Schlossbibliothek RT 2/6 (*Kodex Berleburg*): fol. 247^r.⁸⁹

Jacobus Haller, Colmar, 1478. Berne, Burgerbibliothek, Ms. Hist. Helv. XII: pp. 308, 316–24 (*Colmarer Kunstbuch*).⁹⁰

Bohemia, Bavaria, before 1485. Munich, Bayerische Staatsbibliothek, cgm. 822: fol. 105^r (Cgm 822).

East of the Meuse, 1496–98. Leyden, University Library, Cod. Vossius Chym. Oct. 6: fol. 143^r–45^r (Leyden).⁹¹

Aldersbach?, last quarter of fifteenth century. Munich, Bayerische Staatsbibliothek, cgm. 720: fol. 228^v (Cgm 720).⁹²

80 Ed. Ploss, *Buch von alten Farben*, 137.

81 Ed. Brunello, *Libro*, 185–89.

82 Excerpts ed. Ploss, *Buch von alten Farben*, 138; I would like to thank Sylvie Neven for providing me with a picture of the page.

83 Ed. *ibid.*, 138; I would like to thank Sylvie Neven for providing me with a picture of the page.

84 Ed. Oltrogge, in *Zeitschrift für Kunsttechnologie und Konservierung* 2015 (in prep.)

85 Middle English recipes for block printing on cloth using oleo-resinous media to produce imitation damask and (with flocks) imitation figured velvet, survive in ten fifteenth- and early sixteenth-century English manuscripts, edited in M. Clarke, *Middle English Recipes for Painters, Stainers, Scribes and Illuminators* (in progress for 2016).

86 Ed. Oltrogge, *Datenbank*.

87 Ed. Ploss, *Buch von alten Farben*, 135–40.

88 Ed. Oltrogge, *Datenbank*.

89 *Älterer deutscher 'Macer': Ortolof von Baierland, 'Arzneibuch'; 'Herbar' des Bernhard von Breidenbach; Färber- und Maler-Rezepte: Die oberrheinische medizinische Sammelhandschrift des Kodex Berleburg*, ed. W. Dressendörfer, G. Keil and W.-D. Müller-Jähnke, *Codices illuminati medii aevi* 13 (Munich: Lengenfelder, 1991).

90 Ed. Oltrogge, *Datenbank*.

91 I would like to thank Ad Stijnman for bringing this unpublished manuscript to my attention.

92 Ed. Oltrogge, *Datenbank*.

- Southern Germany, last quarter fifteenth century/first quarter sixteenth century. Jerusalem, The Jewish National and University Library, Edelstein coll., Edelstein 'Alchemical ms, Ger. 1472', fol. 56^r–63^v.⁹³
- Rhineland or Netherlands, end of the fifteenth century. Rome, Biblioteca Apostolica Vaticana, Cod. Pal. lat. 1272: fol. 82^r–83^r (Vat. Pal. lat. 1272 / CPL).
- Eastern Netherlands or Westphalia, end of the fifteenth century. Trier, Stadtbibliothek, Hs. 8^o 1028/1959: fol. 20^v, 27^v (*Trierer niederländisches Kunstbuch*).⁹⁴
- Southern Germany, c.1500. Heidelberg, University Library, Cpg. 211: fol. 39^v (CPG 211).⁹⁵
- Netherlandish technical recipes, early sixteenth century. London, BL, Sloane 345, fol. 23^r–25^r.⁹⁶
- Peder Månsson, Rome, Vadstena, c. 1508–1524. Stockholm, Royal Library, Cod. Holm. (Hdskr. a): fol. 14^v – 21^r; Id. X 530 (Hdskr. b): fol. 184^v–86^v (Månsson).⁹⁷
- Wolfgang Sedelius, Andechs, 1530. St Gall, VadSlg. Hs. 404: fol. 201^v, 202^v and 205^v–207^v.
- Rostock, c.1528. Göttingen, University Library, Cod. Hist. nat. 51: fol. 278^r–79^v (Göttingen).⁹⁸
- Switzerland, second half of the sixteenth century. Engelberg, Stiftsbibliothek, Cod. 431: fol. 103^r–04^r (Engelberg).⁹⁹
- Wolfgang Sedelius, Munich, Augsburg, c.1540–50. Munich, Bayerische Staatsbibliothek, cgm. 4117: fol. 327^r, 337^r–39^v (Sedelius).¹⁰⁰
- Amberg, 1570/71. Heidelberg, University Library, Cpg. 183: fol. 291^r (CPG 183).¹⁰¹
- Amberg, before 1573. Heidelberg, University Library, Cpg. 752: fol. 58^r–59^r (CPG 752).
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- 93 Unpublished manuscript. I would like to thank Ad Stijnman for bringing this unpublished manuscript to my attention; the recipes dealing with oil varnish, gold and flock print on cloth and leather were not evaluated for the tables.
- 94 Ed. Braekman, *Warenkennis*, 121–54, nos. 25, 26, 37–47.
- 95 Ed. Oltrogge, *Datenbank*.
- 96 Ed. W.L. Braekman, *Medische en technische middelnederlandsce recepten: Een tweede bijdrage tot de geschiedenis van de vakliteratuur in de Nederlanden*, Reeks III.40 (Gent: Secretariaat van de Koninklijke Academie voor Nederlandse Taal- en Letterkunde, 1975), 167–68. The manuscript was brought to my attention at too late a stage for it to be included in the tables.
-
- 97 Ed. Johannsen, *Peder Månssons Skrifter*, 167–75.
- 98 P. Seidensticker, ed., 'Mittelniederdeutsche Mal- und Färberezepte aus der Niedersächsischen Staats- und Universitätsbibliothek Göttingen', in *Gedenkschrift für Heinrich Wesche*, ed. W. Kramer, U. Scheuermann and D. Stellmache (Neumünster: Wachholtz, 1979), 287–304, esp. 295–99.
- 99 R. Woudhuysen-Keller, ed., *Das Farbbüchlein: Codex 431 aus dem Kloster Engelberg: Ein Rezeptbuch über Farben zum Färben, Schreiben und Malen aus dem späten 16. Jahrhundert*, 2 vols. (Bern: Abegg-Stiftung, 2012) 1:176–79.
- 100 Ed. A. Bartl et al. (in progress).
- 101 Ed. Oltrogge, *Datenbank*.

The Fust and Schöffer Office and the Printing of the Two-colour Initials in the 1457 Mainz Psalter

Mayumi Ikeda*

In 1457, a newly established publishing office in Mainz, run by Johann Fust and Peter Schöffer, issued a Psalter.¹ It was the second substantial book printed in Europe after the Gutenberg Bible, which had been printed c.1455 in the same city.² As is well known, the Gutenberg Bible took its appearance from its manuscript predecessors.³ The most visible features that characterise a medieval manuscript include the employment of colour and decorative elements, such as rubrics and initials, but reproducing these in print was no easy task for early printers.⁴ In the Gutenberg Bible, the printing of rubrics was attempted at the outset but soon abandoned, likely due to the extra labour it required.⁵ From then on, the printers left blank spaces for the rubrics to be filled in manually. The same approach was taken for the initials that open books and prologues. In manuscripts, they were heightened with colours and occasionally also with decoration. In the Gutenberg Bible, instead of reproducing these initials typographically, the printers left the relevant spaces blank. It was thus left to individual owners of the books to furnish them with initials.

However, for the Mainz Psalter, the publishers attempted to print nearly all of the major components, including colour elements (Figs. 5.1–5.4),⁶ such as

rubrics, red (and occasionally blue) Lombard initials and decorative initials in two colours. As a result of this impressive attempt, the Mainz Psalter now stands as one of the masterpieces of incunabula. Printing the decorative initials in red and blue, arguably the most complex aspect of this printing project, is the focus of this paper. Past studies on these initials, briefly summarised here, concentrated on how the initial blocks were produced and operated. This study aims to shed light on the production sequence of the initial blocks, the designs of the initials, and the apparent problem with the blue ink used by the printers.⁷ It concludes by considering the goals and intentions of the publishers in undertaking this challenging project which, ironically, must have resulted in more labour than finishing the colour elements by hand.

Description of the Mainz Psalter⁸

The Mainz Psalter has survived in ten bound copies and a number of fragments, all on parchment.⁹ Its size is comparable to royal folio, appropriate for a book to be used on a lectern. Two sizes of Gothic *textura* type, here referred to as the smaller and the larger Psalter types, were used for the main text and rubrics. In addition, two

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1 ISTC ip01036000.

2 ISTC ib00526000.

3 First studied in detail in E. König, 'Die Illuminierung der Gutenbergbibel', in *Johannes Gutenbergs zweiundvierzigzeilige Bibel: Faksimile-Ausgabe nach dem Exemplar der Staatsbibliothek Preussischer Kulturbesitz Berlin*, ed. W. Schmidt and F.A. Schmidt-Künsemüller (Munich: Idion, 1979), 69–125. See also C. de Hamel, *The Book: A History of the Bible* (London: Phaidon, 2001), 205.

4 See de Hamel, *The Book*, 205–207, on the ways the printers of the Gutenberg Bible solved this issue.

5 P. Schwenke, 'Untersuchungen zur Geschichte des ersten Buchdrucks', *Festschrift zur Gutenbergfeier* (Berlin: Koenigliche Bibliothek, 1900), 50–51. Rubrics are printed in red on fol. 1^r, 4^r, 5^r, 129^r and 129^v; see also E. Savage, 'Colour Printing in Relief', this volume, 24.

6 Music was not printed, and spaces were left blank for it to be supplied by hand.

7 Some of these questions have been briefly discussed in M. Ikeda, 'The First Experiments in Book Decoration at the Fust-Schöffer Press', in *Early Printed Books as Material Objects: Proceedings of the Conference Organized by the IFLA Rare Books and Manuscripts Section, Munich, 19–21 August 2009*, ed. B. Wagner and M. Reed, IFLA Publications 149 (Berlin and New York: De Gruyter Saur, 2010), 39–49, esp. 39–43.

8 For a comprehensive account of the Mainz Psalter, see O. Mazal, *Der Mainzer Psalter von 1457: Kommentar zum Faksimiledruck 1969* (Zürich: Stocker, 1969).

9 For a list of surviving copies and their current locations, see ISTC. Complete digital facsimiles of the Darmstadt and Vienna copies are available online in the Digitale Sammlungen Darmstadt, Universitäts- und Landesbibliothek, accessed 15 November 2013, <http://tudigit.ulb.tu-darmstadt.de/show/inc-v-7>, and Kataloge der Österreichische Nationalbibliothek, accessed 15 November 2013, <http://data.onb.ac.at/rec/AC08517167>, respectively.

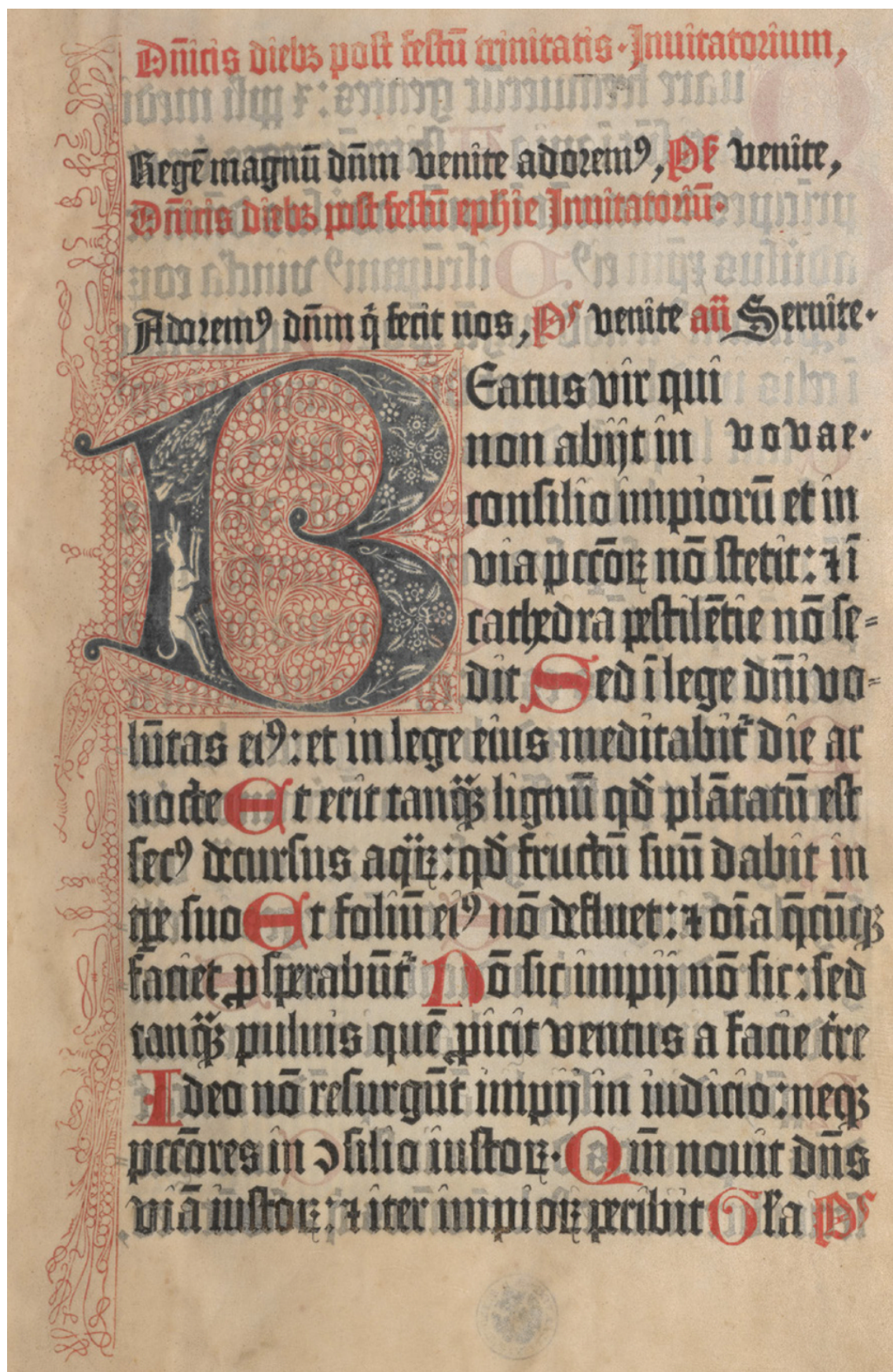


FIGURE 5.1 Psalterium ([Mainz]: Johann Fust and Peter Schöffer, 14 August 1457), fol. 1r
 VIENNA, ÖSTERREICHISCHE NATIONALBIBLIOTHEK, INK.4.B.1; PERMISSION GRANTED BY ÖSTERREICHISCHE NATIONALBIBLIOTHEK

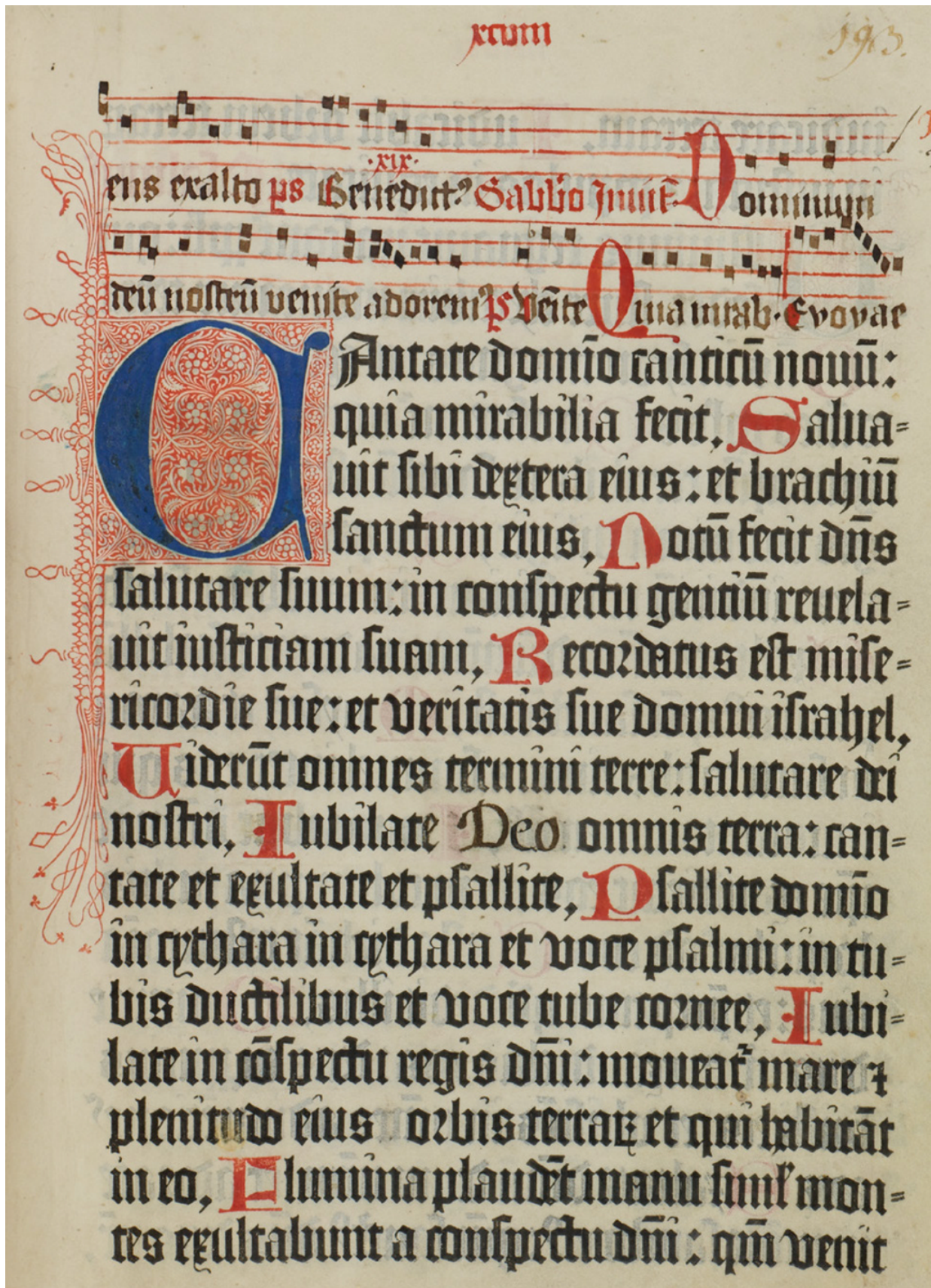


FIGURE 5.2 Psalterium ([Mainz]: Johann Fust and Peter Schöffer, 14 August 1457), fol. 98^r

MANCHESTER, THE JOHN RYLANDS LIBRARY, 9784; REPRODUCED BY COURTESY OF THE UNIVERSITY LIBRARIAN AND DIRECTOR, THE JOHN RYLANDS LIBRARY, UNIVERSITY OF MANCHESTER

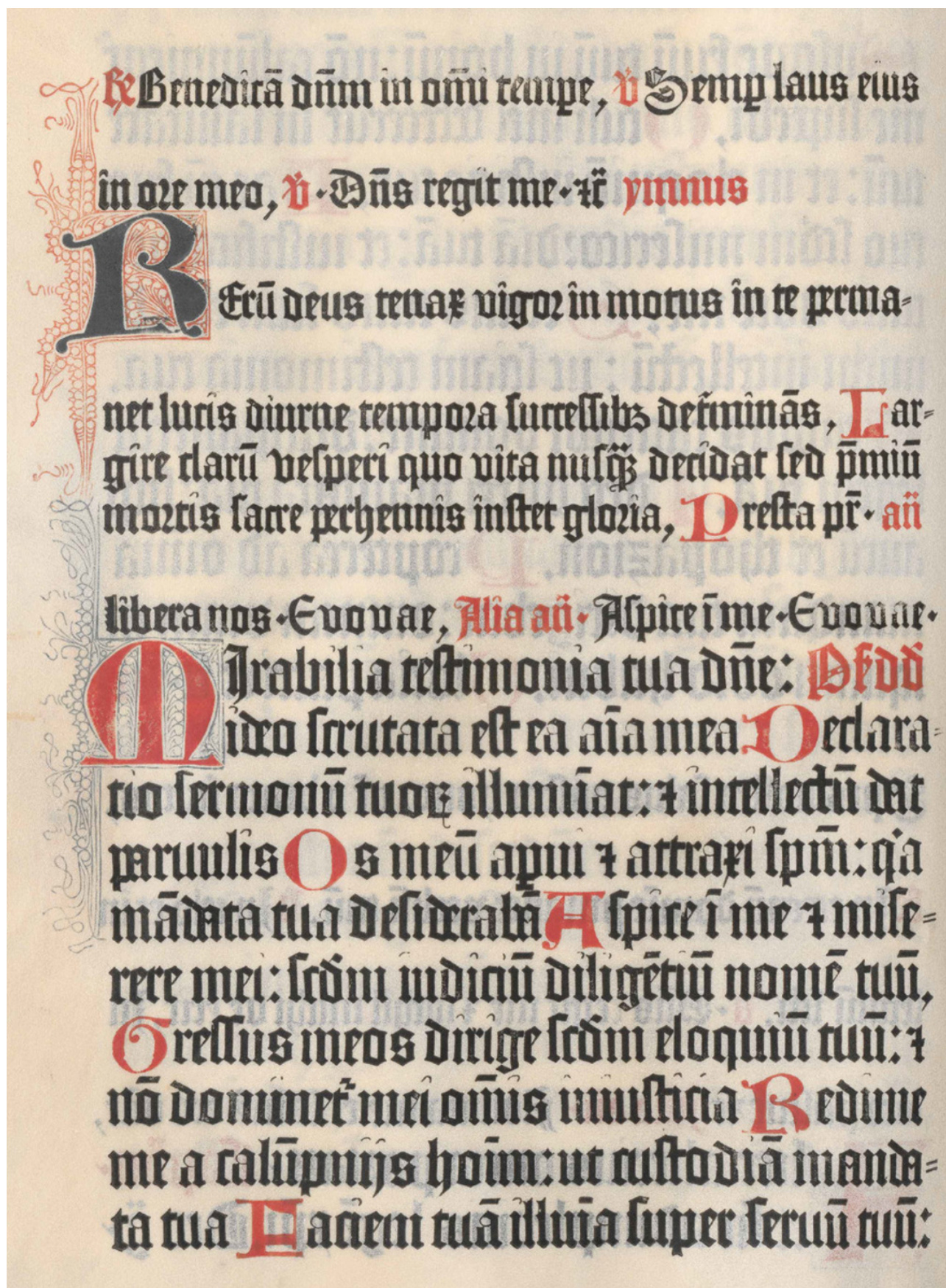
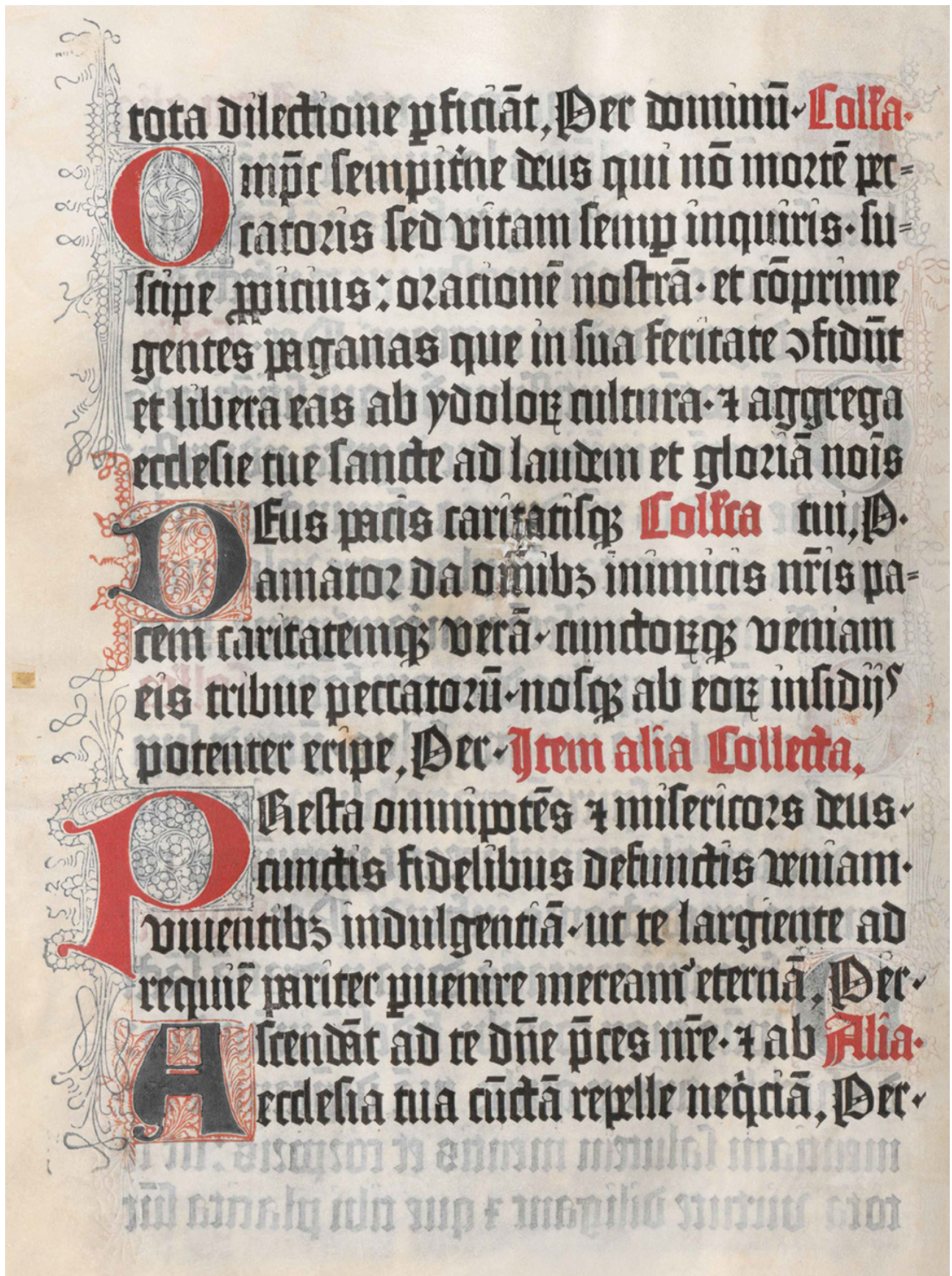


FIGURE 5.3 Psalterium ([Mainz]: Johann Fust and Peter Schöffer, 14 August 1457), fol. 34^v
VIENNA, ÖSTERREICHISCHE NATIONALBIBLIOTHEK, INK.4.B.1; PERMISSION GRANTED BY ÖSTERREICHISCHE NATIONALBIBLIOTHEK

FIGURE 5.4 Psalterium ([Mainz]: Johann Fust and Peter Schöffer, 14 August 1457), fol. 141^v

VIENNA, ÖSTERREICHISCHE NATIONALBIBLIOTHEK, INK.4.B.1; PERMISSION GRANTED BY ÖSTERREICHISCHE NATIONALBIBLIOTHEK

sizes of Lombard alphabet were prepared corresponding to the Gothic type. The Psalter came in two issues of different lengths. The short issue, with 143 folios, conforms in content to the general use of the Western Church, whereas the long issue, with 175 folios, adds to the short issue three supplement quires containing hymns and prayers according to the use of the diocese of Mainz.¹⁰

The Psalter contains a colophon at the end. Headed by a decorative printed initial P, it reads in Latin:

The present book of Psalms, adorned with the charm of capitals and divided sufficiently with rubrications, with the skilful invention of the impressing and stamping of letters, [was] thus formed without any penning of a reed, and in piety towards God [it] was diligently completed, by Johann Fust, citizen of Mainz, and Peter Schöffer of Gernsheim in the year of the Lord 1457 on the Vigil of Assumption [14 August].¹¹

It thus not only states the Psalter's date of publication and the names of its publishers, but also boasts of their achievement in reproducing decorative initials and rubrics without the use of a (reed) pen.

The decorative initials were embellished with delicate flourishes, clearly in imitation of calligraphic penwork commonly used to decorate books and manuscripts of the period (Fig. 5.5). The initials were prepared in three different hierarchies, differentiated by size. The six-line B, which is the largest and the only initial of this size, adorns the opening page of the Psalter (Fig. 5.1). The second in the hierarchy are four four-line initials D, S, E and C (Fig. 5.2). Two-line initials and a marginal letter J, twenty in total, belong to the lowest hierarchy (Figs. 5.3, 5.4). All initials are generally printed in red and blue, their colours alternating between the letter and the surrounding decoration. The printing of these initials is often characterised as a 'dead-end experiment', but these initials were again printed in this way in publications over the next several

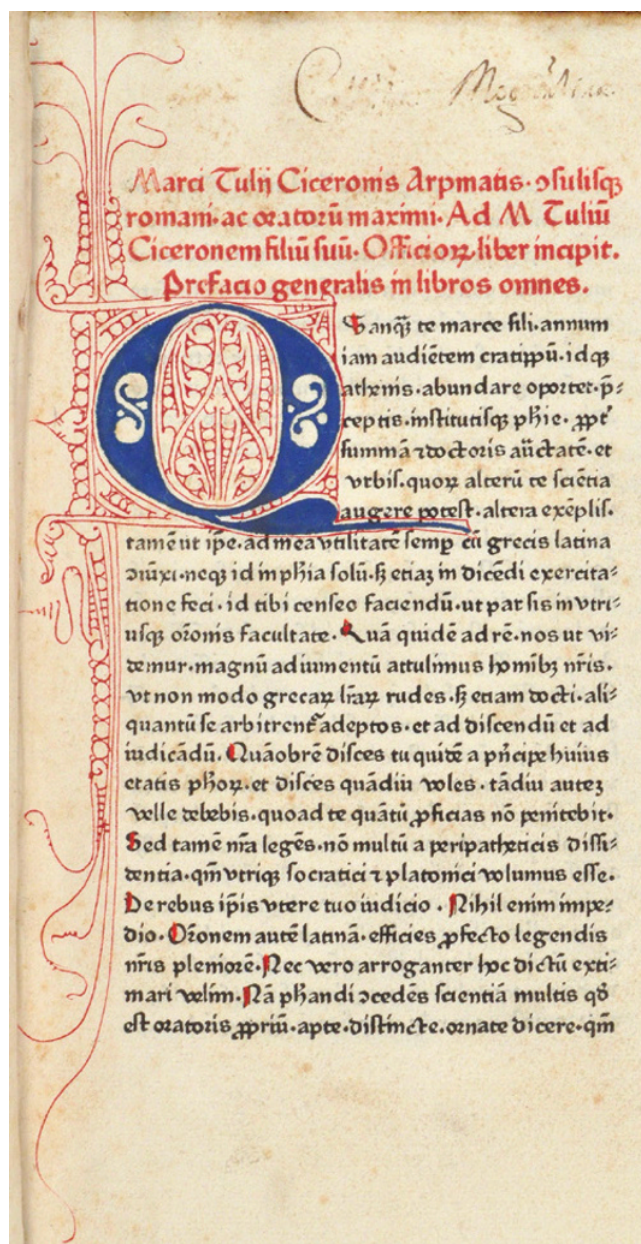


FIGURE 5.5 *Marcus Tullius Cicero, De officiis, Paradoxa stoicorum* ([Mainz]: Johann Fust and Peter Schöffer, 1465), fol. 1^r (detail)

DALLAS, BRIDWELL LIBRARY, SOUTHERN METHODIST UNIVERSITY, SPECIAL COLLECTIONS 06236; PERMISSION GRANTED BY BRIDWELL LIBRARY

decades.¹² How these intricate two-coloured initials were printed will be explained in the following section.

10 I. Masson, *The Mainz Psalters and Canon Missae 1457–1459* (London: Bibliographical Society, 1954), 9–11.

11 'Presens spalmarus [sic] codex-venustate capitalium decoratus Rubricationibusque sufficienter distinctus, Adinventionem artificiosa impremendi ac caracterizandi-absque calami vlla exarcone sic effigiatus, Et ad eusebiam dei industrie est consummatus, Per Johanem fust Civem maguntinum-Et Petrum Schoffer de Gernsheim, Anno domini Millesimo-cccc-lvij-In vigilia Assumpcionis'; see A.W. Pollard, *An Essay on Colophons: With Specimens and Translations* (Chicago: The Caxton Club, 1905), 12–13. On the printers' reuse of the descriptive phrase, see M. Smith, 'Printing Red Underlines in the Incunable Period: Sensenschmidt and Frisner's 1475 Edition of

Justinian's Codex', *Journal of the Printing Historical Society* 10, new series (Spring 2007), 45–57, esp. 49.

12 These include: the *Canon missae* printed c.1458 (ISTC im00736000); the *Rationale divinorum officiorum* (ISTC id00403000) and the *Benedictine Psalter* (ISTC ip01062000), both from 1459; several editions of *Ars minor* of Donatus (including ISTC id00318500 and id00318700); and *Missale Vratislaviense*

Printing the Two-coloured Initials

In the past, the two-coloured initials of the Mainz Psalter prompted various theories as to how the printing blocks were produced and how they operated, but two stand out as the most convincing.¹³ One is the thorough study of these decorative initials by Heinrich Wallau in 1900, and the other is Irvine Masson's painstaking analysis of the Mainz Psalter in 1954, which confirmed Wallau's theory as essentially correct.¹⁴ Based on them, the structure of the blocks for the decorative initials can be summarised as follows: a block was composed of two separable pieces of metal, one for the letter and one for the ornament (Fig. 5.6); the ornament design was cut in relief into the surface of the metal piece that forms the main body of the initial block; a shallow recess in the shape of the letter was created into it; and a separate letter plate was produced to fit in this recess. This structure facilitated inking the ornament and the letter in different colours and printing

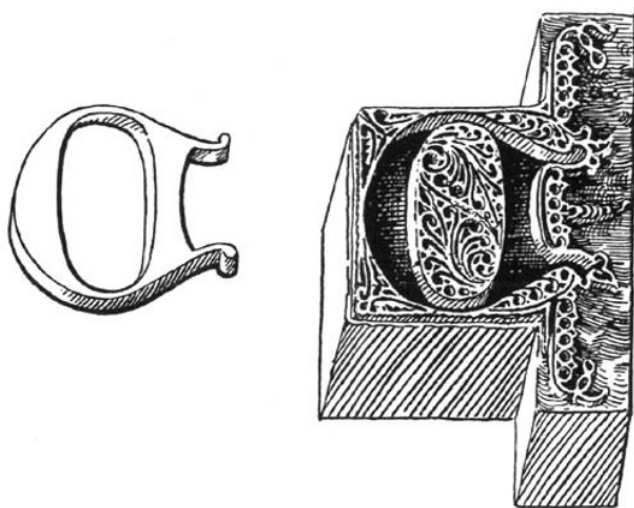


FIGURE 5.6 Heinrich Wallau, reconstruction of the decorative initial block of the Mainz Psalter

IN: H. WALLAU, 'DIE ZWEIFARBIGEN INITIALEN DER PSALTERDRUCKE VON JOHANN FUST UND PETER SCHÖFFER', *FESTSCHRIFT ZUM FÜNFHUNDERTJÄHRIGEN GEBURTSTAGE VON JOHANN GUTENBERG*, ED. OTTO HARTWIG (MAINZ: HARRASSOWITZ, 1900), 262

from 1483 (ISTC im00731000). Most of the Mainz Psalter initials were reused for another edition of the Benedictine Psalter published in 1490 (ISTC ip01062500).

- 13 For an overview of past studies of the Mainz Psalter, see Mazal, *Der Mainzer Psalter*.
- 14 H. Wallau, 'Die zweifarbigen Initialen der Psalterdrucke von Johann Fust und Peter Schöffer', in *Festschrift zum fünfshundertjährigen Geburtstage von Johann Gutenberg*, ed. O. Hartwig (Mainz: Harrassowitz, 1900), 261–304; Masson, *The Mainz Psalters*.

the two elements together, a technique known as jigsaw printing.

With some exceptions, an entire page of the Psalter, which typically includes more than one colour, was printed in a single pull.¹⁵ This means that the text in black, rubrics in red, red or blue Lombard initials and decorative initials, when they appear on a single page, were printed simultaneously. To realise this, a page was first set in a forme. Those parts that needed to be inked in colour were then taken out of it and inked with relevant colours while the main text, remaining in the forme, was inked in black. The coloured pieces were then put back, and finally all elements were printed together. This procedure was repeated for every pull. Whilst the single-pull printing was certainly tedious for the pressmen, it assured a perfect register, and hence contributed to the clean appearance of the Psalter, a feat that would have been difficult to achieve by printing in multiple pulls.¹⁶ This must have been the chief reason for keeping to this laborious procedure.

However, there were cases in which a decorative initial was printed in a second pull.¹⁷ This happened either when the same initial was needed twice on a single page (which incidentally proves that there was not a second block made for that initial), or when two initials were located too close together so that their extending flourishes would collide when set together in the forme. Fol. 141^v demonstrates one such case (Fig. 5.4): of the four two-line initials, the O and the P were printed first, together with the text, whilst the D and the A were printed in a second pull.¹⁸ The order of printing can be determined by the fact that both the D and the A show a slight overlap with part of the text.

- 15 A. Schmidt, 'Untersuchungen über die Buchdruckertechnik des 15. Jahrhunderts', *Zentralblatt für Bibliothekswesen* 14 (1897), 169–72; Wallau, *Die zweifarbigen Initialen*, 263–65 and 279; Masson, *The Mainz Psalters*, 26–30. It should be noted that, unlike Wallau and Masson, Schmidt believed that an entire decorative initial block was made of a single piece rather than separable pieces and was printed à la poupée.
- 16 Ibid. Decorative initials were reused in some copies of the *Rationale divinorum officiorum* printed by Fust and Schöffer in 1459 (ISTC id00403000), but they were printed in separate pulls from the main text, thus causing overlaps with the text in some areas.
- 17 Wallau, *Die zweifarbigen Initialen*, 281–82; Masson, *The Mainz Psalters*, 53–54.
- 18 On the recto of this folio, four two-line initials (D, O, O, D) were printed, once again in two separate pulls. This means that this folio alone went under the press no less than four times. From various pieces of evidence, Masson convincingly proposed that this folio, which is a singleton, was printed after all other pages except the colophon page were finished; Masson, *The Mainz Psalters*, 51, and also 59 for the printing sequence of the Mainz Psalter.

Noteworthy is that the printers were careful enough not to ink the extending flourishes of the A so as to avoid printing over the flourishes of the P.

Production Sequence of the Decorative Initials

Masson demonstrated that not all materials were ready and waiting when the printing of the Psalter began. For instance, several kinds of types were gradually supplied in the course of printing to meet the demand.¹⁹ Such a flexible approach, which was normal in early printing projects, may also be observed in the printing of the decorative initials: when the printing started, it seems that not all of the required initial blocks had been prepared, and that designers and cutters were still working to have them ready in time. This is indicated by the absence of five two-line initials in the Psalter, namely W, X, Z, H and Y. Of these, the first three were not needed in the Psalter, so it was probably never planned to produce them. However, H and Y were needed, but only in the three supplement quires of the long issue which, according to Masson, were the three final quires to be printed before the reprint began.²⁰ One may suppose that, when preparing to print the supplement quires, it was decided that no more initials were to be newly produced. This hypothesis is, however, challenged by the existence of the two-line initial G, printed only on fols. 163^r and 169^r in the supplement quires. Was this G prepared just for the supplement quires?²¹ In fact, it was probably produced for fol. 29^v in a common quire, on which a two-line space was reserved for a G. However, the G was not printed because the space, created by the indentation of two lines of the smaller Psalter type, is only 2.5 cm high, whereas all two-line initials including the G were around 3 cm high to fit a two-line space of the larger Psalter type. It would seem that the printers, realising only when composing fol. 29^v that the G block would not fit the given space, had to wait until fol. 163^r to make use of it.

Supposing that the initial blocks were fashioned as the need arose in the Psalter, the four-line C and the two-line K, the two last initials to make their first appearances in the Psalter, would be the last two produced.²² This

assumption accords with the peculiar characteristics observed in them, to be discussed below.

Designs of the Initials

Unlike the structure and operation of the initial blocks, their designs and designers have thus far received little attention.²³ As mentioned above, these decorative initials are imitations of calligraphic initials found in manuscripts. From the quality of their designs one may reasonably assume that they were mostly designed by practised scribes. Several distinctive styles are noticeable in these initials, suggesting the participation of multiple designers. While it is unrealistic and may even be misleading to attempt a precise assignment of designers to all of the initials, it is worthwhile to group some of them by their characteristic features.

The most elaborate initial, the six-line B, shows a precise and stylised penwork, characterised by a bead motif and symmetrical lines; it must be attributed to a skilled scribe (Fig. 5.1). The cutter of this technically demanding initial must likewise have been an able craftsman, as every detail of the fine lines has been impeccably reproduced. The design of the four-line D and also those of a number of two-line initials, such as B, M and R, come close to that of the six-line B (Fig. 5.3).

The two-line A demonstrates a very different temperament: it is characterised by the depiction of naturalistic leaves (Fig. 5.4). There are several other two-line initials such as the I, the O and the T that contain vegetal or quasi-vegetal motifs, but many of them are unique to each initial. Also, many of the initials with vegetal motifs have stylised extending flourishes with a bead motif similar to those in the first group (see the O in Fig. 5.4). It is thus difficult not only to identify which motifs belong to which designers, but also to determine whether or not two hands were responsible for designing some of the initials.

In contrast, the two-line initials L and P demonstrate an undeniable stylistic relationship: in the eyes of both initials are found circles enclosing several smaller circles, a motif distinctive enough to be assigned to a single hand (Fig. 5.4). The four-line E, printed only on fol. 85^v, is another initial with a unique design, with a motif in the eye that recalls stained glass windows of a Gothic church. This design is not found in any other initial, and it is possible that its designer worked on this initial only.

19 Masson, *The Mainz Psalters*, 37–45.

20 Masson, *The Mainz Psalters*, 37ff and 59.

21 William Scheide rejected the present hypothesis precisely because of the presence of this G; W.H. Scheide, 'A Speculation Concerning Gutenberg's Early Plans for His Bible', *Gutenberg-Jahrbuch* 48 (1973), 129–39.

22 For the printing sequence of the Psalter, see Masson, *The Mainz Psalters*, 37ff and 59.

23 H. Wallau, '2. Der Canon missae vom Jahr 1458: B. Typographische und druckästhetische Erläuterungen', in *Veröffentlichungen der Gutenberg-Gesellschaft* 3 (Mainz: Gutenberg-Gesellschaft, 1904), 47–49; Scheide, *A Speculation*, esp. 137–39.

The four-line C and the two-line K can be distinguished from the rest not only by their design but also by their production process (Fig. 5.2).²⁴ Firstly, both initials are composed of two distinct styles. The stylised flourishes that extend from the initial body are close to the first group, but the flourishes that fill the squared area enclosing the initials are thoroughly unique.²⁵ This type of design, consisting of whirling tendrils and many offshoots, belongs more to the illuminator's work than to the scribe's, as found in many German illuminated initials of the period. It may be that two designers, possibly an illuminator and a scribe, worked on these initials.²⁶ Secondly, probably prompted by the looser, more organic lines, a new cutting method was employed for the flourishes in the squared area. Whereas all other initials are cut in relief, these are engraved in intaglio; when they are printed, the decoration is shown in white and the inked metal surface becomes the background. This method is obviously easier than cutting intricate lines in relief.

Now, it will be recalled that the C and the K were very likely the two final blocks produced for the Psalter, which would mean that the cutters introduced the intaglio cutting only at this stage. And once they used it, they seem to have preferred it, since the same cutting method was used in two initial blocks produced for two subsequent publications from the Fust and Schöffer office, namely a six-line T for the *Canon missae* printed c.1458 and an initial Q for the *Rationale divinorum officiorum* of Durandus printed in 1459.²⁷ Furthermore, the squared areas of the T and the Q are undoubtedly by the same designer of the four-line C and the two-line K. It seems that this designer joined the Psalter project at the last stage and continued to design two more initials for the following publications. It is worth noting that the designer who was probably responsible only for the abovementioned four-line E was also a latecomer; the E is presumably the twenty-second out of the twenty-five initials produced for the Psalter. Towards the end of the production, at least two more designers seem to have joined the project, perhaps because the printers were under pressure to complete the

initial blocks in time or because other designers became unavailable.

Problem with the Blue Ink?

As we have seen, the decorative initials of the Mainz Psalter were designed to be printed in two colours, namely red and blue. While the red ink used for printing the initials, though not necessarily the same red ink used for printing the moveable type, does not demonstrate any serious problems, several pieces of evidence imply that the printers had some issue with the blue ink, which appears dull and greyish. For example, we occasionally see both the letter and the decoration of an initial printed in red only.²⁸ Whilst in some cases this may have been due to a mistake in inking, an initial printed only in blue is an extremely rare phenomenon.²⁹ In addition, there are cases in which the 'mistake' persists in several copies, indicating that the printers proceeded without correcting the colour.³⁰ At least on some occasions the blue must have been intentionally avoided. Also, in the Manchester copy, nearly all of the blue letters of the decorative initials and the Lombard initials have been neatly painted over with a thick bright blue paint of a grainy texture (Fig. 5.2).³¹ This overpainting was probably undertaken at the press, as the same procedure is found in some copies of the Bible published in 1462 by the same workshop, as discussed below.

That the Fust and Schöffer office was unable to find a satisfactory blue ink for some time is shown in their edition of the Bible issued in 1462.³² Soon after the printing started, the printers began printing Lombard initials and chapter numbers in red and blue.³³ A few pages later, however, blue printing was switched to blind printing.

24 This point has been discussed, with colour illustrations, in Ikeda, *The First Experiments*, 40–43.

25 The two discrete designs in these two initials were first noted in Scheide, *A Speculation*, 139.

26 Elsewhere I have argued that these two initials, except the extending flourishes, were designed by the Fust Master, an illuminator known to have worked for the Fust and Schöffer office; see Ikeda, *The First Experiments*, 40–43.

27 See note 12 above. For illustrations see Ikeda, *The First Experiments*, Ills. 4–5. The Q, taking up thirteen lines in the *Rationale*, is equivalent in size to the four-line initial of the Mainz Psalter.

28 In the copy at the Staatsbibliothek zu Berlin/Preußischer Kulturbesitz (Inc. 1513), which I examined firsthand, the 'red' ink used for the decoration of these initials consistently had a violet tone, which was clearly different from the strong red ink used for the decoration of other initials.

29 The single case thus far found of a blue initial with blue decoration printed by this office is the marginal 'J' on fol. 106^r of the Gutenberg-Museum copy of the Benedictine Psalter, printed in 1459 (ISTC ip01062000; shelfmark GM Ink 34).

30 Examples are the E on fol. 128^v and the U on fol. 130^r, printed entirely in red in the Berlin, Darmstadt, Manchester, Vienna and Windsor copies.

31 Manchester, John Rylands University Library, S9784. Compare with the unpainted initial C from the Vienna copy in Ill. 2 of Ikeda, *The First Experiments*.

32 ISTC ib00529000.

33 On the printing sequence of the 1462 Bible, see P. Needham, 'The 1462 Bible of Johann Fust and Peter Schöffer (GW 4204): A Survey of Its Variants', *Gutenberg-Jahrbuch* 81 (2006), 19–49, esp. 40.

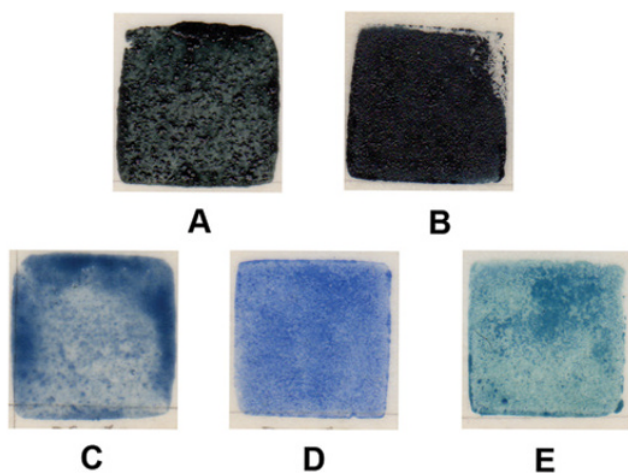


FIGURE 5.7 *Atelier du parchemin*, samples of various blue inks (mixture of approx. 60% pigment and 40% burnt linseed oil) stamped on sheepskin parchment. A: Woad; B: Indigo; C: Ultramarine (fine); D: Ultramarine (coarse); E: Azurite
PERMISSION GRANTED BY ATELIER DU PARCHEMIN

Meanwhile, red printing was carried out to the end.³⁴ As Adolf Schmidt has mentioned, the publishers were probably unsatisfied with the dull blue ink they used,³⁵ or perhaps there was a problem with its handling which discouraged them to continue with it.³⁶ The blind-printed initials were intended to be painted over in blue by hand, either at the office or by individual owners, but the parchment copy held at the Scheide Library in Princeton and the paper copy held at the Gutenberg-Museum in Mainz were certainly finished at the office: not just the blind-printed initials but also those printed in blue were duly overpainted with a thick blue paint with a grainy texture, similar to that used in the Manchester Psalter discussed above.³⁷ The Scheide copy was richly illuminated by the Fust Master, an

artist known to have worked for this office, so it is likely that Fust and Schöffer prepared it as a luxurious copy.³⁸

We might wonder what pigment was used for the blue ink, which evidently caused much trouble to Fust and Schöffer. In a recent analysis conducted by the British Library of the blue inks in three copies of the Fust and Schöffer publications, the examined areas from two copies showed a chemical signature of indigo, which means that the pigment used was either indigo (*Indigofera*) or woad (*Istatis tinctoria* L.).³⁹ Indigo was imported routinely from Asia to Europe in large quantities and was readily available, but woad, which was produced in Europe mainly as a dyestuff, was a cheaper commodity than indigo, for which Erfurt (250 km from Mainz) was a major trading centre.⁴⁰ It therefore seems likely that our printers used woad for their blue ink.

When used as a pigment, woad, as well as indigo, yields a dark slate blue that tends towards grey, which contrasts with the brighter blues of ultramarine and azurite (Fig. 5.7). The blue in the Mainz Psalter appears lighter than pure woad, so it could have been mixed with lead white,⁴¹ but it cannot compete with the more intense blue used in manu-

34 This phenomenon was first mentioned in Schmidt, *Untersuchungen*, 162–64. See also E. König and H. Tenschert, *Biblia pulcra: Die 48zeilige Bibel von 1462. Zwei Pergamentexemplare in der Bibernmühle* (Ramsen: Heribert Tenschert, 2005), 56.

35 Schmidt, *Untersuchungen*, 164.

36 Blue printing ink continued to be problematic for decades; on the irregularity and extreme rarity of blue inks (presumably from indigo or woad) used for printing woodcuts in sixteenth-century Germany, see A. Klein, 'Hans Wechtlin', this volume, 105.

37 Princeton, the Scheide Library, S4.3. A complete digital facsimile of the Scheide copy is available online at Princeton University Digital Library, accessed 15 November 2013, <http://arks.princeton.edu/ark:/88435/gt54kn106>. Mainz, Gutenberg-Museum, GM Ink 32b (vol. 2 only). This copy, with an old binding, preserves as waste-paper a foul leaf from the parchment copy of this Bible (fol. 74), implying that the binding, and by extension also the overpainting of the initials, were executed on order of the printing office.

38 Ikeda, *The First Experiments*, esp. 46–48.

39 According to the report of the analysis which the author received after the proof of this text was submitted, blue inks on p. 7 of a 1459 Benedictine Psalter (1C.75) and fol. 2^v of a 1459 *Rationale divinorum officiorum* (C.14.e.6) were examined using XRF and visible reflectance spectroscopy. Their results suggested the use of indigo and lead white. The blue ink used for Jeremiah 12 (fol. 57^v) in the second volume of a 1462 Bible (1C.102) was examined using XRF and found to contain copper, in which case azurite may have been included in the ink. I am most grateful to John Goldfinch, formerly Head of Incunabula and Early Printed Collections, and Paul Garside, Conservation Scientist, British Library for conducting the analysis, and to Karen Limper-Herz for examining the 1462 Bible for me.

40 H. Schweppe, 'Indigo and Woad', in *Artists' Pigments: A Handbook of Their History and Characteristics*, ed. E.W. FitzHugh, 3 vols. (Washington, D.C.: National Gallery of Art, 1997) 3: 83, 90; P. Spufford, 'Lapis, Indigo, Woad: Artists' Materials in the Context of International Trade Before 1700', in *Trade in Artists' Materials: Markets and Commerce in Europe to 1700*, ed. J. Kirby, S. Nash and

J. Cannon (London: Archetype, 2010), 10–13; Ibid., *Power and Profit: The Merchant in Medieval Europe* (London: Thames & Hudson, 2002), 332–34; G. Heydenreich, 'The Leipzig Trade Fairs as a Market for Painters' Materials in the Sixteenth Century', in Kirby, Nash and Cannon, *Trade in Artists' Materials*, 308–09.

41 See note 40 above. 'Indigo', in Kirby, Nash and Cannon, *Trade in Artists' Materials*, 452; C.H. Bloy, *A History of Printing Ink, Balls and Rollers, 1440–1850* (London: Evelyn Adams & Mackay, 1967), 32. For the technical examination of inks see B. Price *et al.*, 'A Technical Study', this volume, 140–50.

scripts.⁴² Not being able to produce a satisfactory blue, the printers had to either settle for the greyish blue or abandon its use, and for special copies they painted over the greyish blue ink with a thicker, richer blue of a better quality.

Conclusion

The handling of the blue ink at the Fust and Schöffer press is indicative of what colour, and, by extension, what printing technology meant for these publishers. They obviously aimed higher than simply printing a book in multiple colours, which was an impressive achievement in itself. They were concerned that the colour inks they used would be of a sufficient quality. When they were

unable to produce them satisfactorily, as was the case with the blue ink, they would utilise hand painting.

The printing of the Mainz Psalter was a large-scale project, employing a team of skilled designers and cutters, preparing good colour inks and adopting the laborious single-pull printing. Had the publishers considered printing merely as a means for the mass production of books, they could have left the provision of colour elements, the most laborious aspect of the project, to individual owners, as was done for the Gutenberg Bible. However, Fust and Schöffer seem to have aimed to reproduce fine ‘manuscripts’ in print, to squarely compete against real manuscripts. They made no compromise in achieving their goal, even if that meant abandoning at times a purely typographical approach. The proud printers’ claim in the colophon that they produced the Psalter without the use of a pen (though we now know that there were exceptions to this) should be read in this light. This first publication by the Fust and Schöffer press turned out to be one of the most ambitious printing projects by it, which pushed the limit of what could be done in typography.

⁴² Azurite was the most common blue used in German manuscripts of the period. D. Oltrogge, “*Pro lazurio auricalco et alii correquisitis pro illuminacione*”: The Werden Accounts and Other Sources on the Trade in Manuscript Materials in the Lower Rhineland and Westphalia Around 1500’, in Kirby, Nash and Cannon, *Trade in Artists’ Materials*, 191–92, n. 55.

Colour-Printed Pasteprints, 1460s–1480s

Andreas Uhr

So-called ‘pasteprints’, which were made from the 1460s to the 1520s, are among the most fascinating creations of early graphic art.¹ Up to 300 genuine specimens have come to light,² but their method of production has not yet been fully understood.³ Printing is conventionally understood to

involve the production of multiple two-dimensional replications of a matrix with an oil-based or water-based ink on a flat support (usually paper, more rarely fabric or parchment) in a printing press or by a manual process, but pasteprints are generally three-dimensional objects that were ‘printed’ from a matrix in relief with a material that has been called ‘paste’ (for lack of a better term) from its first description in 1860.⁴ Other than being resin-based, its composition varied greatly and did not follow a specific recipe.⁵

The number of publications concerning pasteprints remains sparse due to the objects’ poor state of preservation (their surfaces are often crumbled, leading to significant material losses),⁶ and, as earlier authors complained, the near-impossibility of reproducing their colours and surface texture accurately until very recently.⁷ Among the very few illustrations not in black-and-white were the very

Translated by Freya Buechter-Greiner.

- 1 Cf. W.L. Schreiber, *Handbuch der Holz- und Metallschnitte des xv. Jahrhunderts* [...], 8 vols. (Leipzig: Hiersemann, 1926–1930), vi, which is still considered the most authoritative catalogue, and the addendum following the entry on pasteprints in Schreiber, *Handbuch*, viii: 145–47, 158. Schreiber identified 203 specimens of 178 visually distinguishable pasteprints, almost all surviving in a unique impression. In this paper, they are referred to in the format ‘Schr. no.’, and supplementary entries as ‘Schr. vol. no.’ Scholars occasionally refer to an unpublished second supplement as the ninth volume, cf. the preface to T.O. Mabbott, ‘Relief Prints in American Private and Public Collections in New York, Cambridge, Cincinnati, Kansas City’, in *Einblattdrucke des xv. Jahrhunderts* (Strasbourg: Heitz, 1940), 99. According to Erwin Kistner, Mabbott was in charge of planning it; E. Kistner, ‘Studien an Teigdrucken aus dem Besitz des Germanischen Nationalmuseums in Nürnberg’, in *Festschrift Eugen Schollreither zum 75. Geburtstag gewidmet von Fachgenossen, Schüler, Freunden*, ed. F. Redenbacher (Erlangen: Universitätsbibliothek, 1950), 65–97, 86.
- 2 This figure includes poorly preserved exemplars, some of which were omitted by or unknown to Schreiber; Schreiber, *Handbuch*, 6: 3, footnote. Since the publication of his pivotal sixth volume, hardly any well-preserved pasteprints have been discovered. See also P. Heitz, *Einblattdrucke des xv. Jahrhunderts*, ed. T.O. Mabbott (Strasbourg: Heitz, after 1932), vols. 78, 95, 97, 99. Some pasteprints that were rediscovered at the Germanisches Nationalmuseum, Nuremberg, in June 1947 were described in detail in 1950 in Kistner, *Teigdrucken*, 65–97. Christian von Heusinger elaborated on Kistner’s findings in ‘Ein unbeschriebener Teigdruck in der Zentralbibliothek Zürich’, *Zeitschrift für Schweizerische Archäologie und Kunstgeschichte*, 15 (1954/1955) 4: 239–43. Some pasteprints recently found at the Herzog August Bibliothek, Wolfenbüttel, are in excellent condition; A. Uhr, ‘Graphische Raritäten: Teigdrucke in Büchern aus niedersächsischen Frauenklöstern, heute in der Herzog August Bibliothek Wolfenbüttel’, in *Rosenkränze und Seelengärten: Bildung und Frömmigkeit in niedersächsischen Frauenklöstern*, ed. B.-J. Kruse, exh. cat. (Wiesbaden: Harrassowitz in Kommission, 2013), 63–70; images are available at <http://www.virtuelles-kupferstichkabinett.de> (search ‘Teigdruck’).
- 3 Analyses have provided disparate results; A. Scheld and R. Damm, ‘Flock Prints and Paste Prints: A Technological Approach’, in *The Woodcut in Fifteenth-century Europe*, Center for Advanced Study

in the Visual Arts Symposium Papers 52, ed. P.W. Parshall (Washington, D.C.: National Gallery of Art; New Haven, London: Yale University Press, 2009), 317–36; S. Bertalan, ‘Medieval Pasteprints in the National Gallery of Art’, in *Conservation Research 1993: Six Essays on Conservation Techniques, Practices, and Research*, ed. R.M. Merrill (Washington, D.C.: National Gallery of Art, 1993), 31–61; E. Coombs and E. Farrell, ‘Pasteprints: A Technical Investigation of Some Fifteenth-Century Composite Prints’, in *Pasteprints: A Technical and Art Historical Investigation*, ed. E. Coombs and E. Farrell, R.S. Field (Cambridge, Mass., Office of the University Publisher, 1986), 1–26.

- 4 The term ‘*empreintes en pâte*’ was first used in J.D. Passavant, *Le Peintre-Graveur*, 6 vols. (Leipzig: Weigel, 1860–64) 1: 102–106.
- 5 On recipes, see D. Oltrogge, ‘Colour Stamping’, this volume, 51–64.
- 6 For an overview of research history, see R.S. Field, ‘The Study of Pasteprints, 1854–1986’, in Coombs, Farrell and Field, *Pasteprints*, 27–46; it is the basis for ‘Zur Technik des Teigdrucks – neueste naturwissenschaftliche Untersuchungen’, in I. Fleischmann, *Metallschnitt und Teigdruck: Technik und Entstehung zur Zeit des frühen Buchdrucks* (Mainz am Rhein: Von Zabern, 1998), 27–49.
- 7 Franz Martin Haberditzl, for instance, excluded from his list pasteprints that were part of the print collection at the court library in 1920 and are now preserved in the Albertina, Vienna, ‘because their reproduction by collotype yields unserviceable results’, F.M. Haberditzl, *Die Einblattdrucke des xv. Jahrhunderts in der Kupferstichsammlung der Hofbibliothek zu Wien*, Vol. I: Die Holzschnitte (Vienna: Verlag der Gesellschaft für vervielfältigende Kunst, 1920), 3.

expensive colour reproductions in Georg Leidinger's 1908 study of the numerous pasteprints in manuscripts of the Bayerische Staatsbibliothek, Munich.⁸ Hence little heed could be paid to pasteprints' colouration or production. Nevertheless, attempts at explaining the method were at the heart of research from the very beginning.⁹ They were mainly limited to embossed exemplars made with black printers' ink, which is found in almost all but a very few surviving specimens, excluding the special case of 'flock prints' with purple-dyed wool dust applied to red-coloured paste.¹⁰ This paper will discuss these colourful exceptions and other exemplars that involve an approach to colour printmaking or that previous studies have considered as colour prints.

Thomas Ollive Mabbott, who in 1932 undertook a systematic classification based on pasteprints that had been listed by Schreiber,¹¹ initially viewed the colourful appearance of the objects he presented as of secondary significance. He classified the sheets identified as pasteprints according to their techniques of production, focussing on their external appearance.¹² Nevertheless, he took into

account that colour was a design element of several pasteprints in his description of the substrates, and he mentioned that several colours had been added at the end of the production process.¹³

Vagaries of terminology make it unclear whether pasteprints can be considered colour prints. If one proceeds from the assumption that a printed image is simply a design that can be produced in multiples from a matrix, not necessarily involving a printing press, and that a colour print involves any colour of a material (not necessarily printing ink) excepting black in monochrome, then many would meet the requirements. If a 'print' must be produced with a printing press and a 'colour print' must involve the application of printing ink, and in more than one colour, they would not. Since the prepared paste substrates into which the image is pressed by an embossing plate also have a coloured surface that interacts visually with the ink in the unprinted areas,¹⁴ it is not enough to concentrate on the colour of the ink. The relief effect of pasteprints was only made possible through their substrates, which both lent the picture radiance after the embossing plate was removed and enhanced the three-dimensional effect. In any case, it is clear that these coloured substrates are a constitutive element of every pasteprint: the choice of substrate shaped the appearance of each impression. Additionally, and like traditional fifteenth-century relief and intaglio prints, the finished sheets were usually partially coloured by brush after embossing. As the last step in the production of relief and intaglio prints, brushing with water-colour or washing them with ink not only added the final touch but also disguised flaws from the printing process. Flock prints, again, are exceptional; only one, *St Barbara* (Schr. 2833), now in Würzburg, was coloured.¹⁵ In it, the host appears above the once golden yellow chalice, symbolizing the Eucharist and the Christian faith that the saint refused to abjure, and its thin silver-coloured coating sets it off from the surrounding red-violet surface.

8 G. Leidinger, *Die Teigdrucke des fünfzehnten Jahrhunderts in der k. Hof- und Staatsbibliothek München* (München: Callwey, 1908). These illustrations were reproduced from up to four printing plates per image in order to convey the colours.

9 Even the first description of a pasteprint contains a suggestion as how it was produced: L. Bechstein, 'Unica et Nondscripta: Mitteilungen', *Deutsches Kunstblatt: Zeitung für bildende Kunst und Baukunst. Organ der deutschen Kunstvereine*, 1 (1850) 17: 131–32.

10 Very few are known; Schreiber, *Handbuch*, 6 and 8: nos. 2789.x, 2833, 2833.x, 2844, 2862.m. In reference to Schr. 2833, Scheld and Damm established that the glue was not that used in other flock prints: '[i]n Saint Barbara, the binding medium for the flock was of a greyish-brown colour with a pastelike consistency'; Scheld and Damm, *Flock Prints*, 321. For a further explanation of this printing technique, cf. Scheld and Damm, *Flock Prints*, 318–22; G. Leidinger, 'Ein Samt-Teigdruck des fünfzehnten Jahrhunderts', *Archiv für Buchgewerbe und Gebrauchsgraphik*, 64 (1927) 3: 213–22. See also D. Oltrogge, 'Colour Stamping', this volume, 53, 60.

11 T.O. Mabbott, 'Pasteprints and Sealprints', *Metropolitan Museum Studies* 4 (1932) 1: 55–75.

12 Some aspects of the classification system for the various types of pasteprints that Mabbott published in 1932 are now known to be incorrect. This is primarily due to his difficulty in accessing European exemplars from America and his necessary reliance on printed illustrations and black-and-white photographs. While these afforded a two-dimensional representation of the coloured or colour-printed relief-like objects, their colour schemes were reduced to greyscale or heavily compromised. On the lively exchange between Mabbott and Schreiber, see S. Griese, 'Wilhelm Ludwig Schreiber (1855–1932): Biographie und Bibliographie', *Aus dem Antiquariat: Zeitschrift für Antiquare und Büchersammler*, N.F. 17 (2004): 264–75, 266ff.

13 Cf. in particular those statements concerning the category 'iv. Normal Pasteprints', Mabbott, *Pasteprints*, 69–75.

14 Metal foils covered with an orange-coloured glaze are now partially exposed on the coloured paste.

15 This pasteprint (illustration: 260 × 190 mm; the exact measurements of the object cannot be determined due to its glazing) is stored at Würzburg University Library, 36/E 61: <http://vb.uni-wuerzburg.de/ub/permalink/36e61>. It is pasted to a book cover that was removed from the binding of an unknown volume. According to Angelika Pabel (Manuscripts and Early Printed Collections, Universitätsbibliothek Würzburg), an examination of the possible original books, conducted on the basis of incunabula mentioned in the literature, was inconclusive (personal correspondence, 9 May 2011).

Colour in Pasteprints

Schreiber assumed that the following pasteprints were printed between the 1460s and 1480s at least partially in blue, green or purple, but this could not always be confirmed. Thus *St Barbara* in the Staatsbibliothek zu Berlin, which was believed to have been printed partially in blue (Schr. VII *2833.b) c.1460, displays merely a gleam of blue around the edges.¹⁶ It has been badly affected by moisture and by the inadequacy of the small amount of primer paste that was applied for the size of the embossing plate, so it has traces of blue wherever the primer paste failed to cover the page during printing. The primer paste has survived only on the upper third of the page in remnants of any appreciable size, but it is still possible to recognize the contours of the applied paste because the margins of the paper are coloured only up to the rim of the area covered by the paste. On this narrow strip, black printers' ink is covered with a fine blue haze. Therefore one can assume that a frame of blue colour (paint, added by hand) originally covered the margins to disguise the scanty application of primer paste. This solution to covering such transitions is often seen where single-sheet pasteprints are inserted into manuscripts. For example, an impression of *Christ in the Winepress* (Schr. 2813; Fig. 6.1) has such a narrow blue frame.

Another piece of negative evidence for colour printing came from examining an impression in the manner of *The Passion* that was partially printed in green, according to Schreiber. Most of these stylistically uniform pages bear the monogram of the same workshop and are in the possession of the Germanisches Nationalmuseum, Nuremberg;¹⁷ yet Schreiber was familiar with only some.¹⁸ He



FIGURE 6.1 *Christ in the Winepress* (Schreiber 2813), c.1470, red pasteprint, 10.4 × 7.9 cm, pasted to a leaf (13.6 × 9.5 cm)
MUNICH, STAATLICHE GRAPHISCHE SAMMLUNG, 171460;
© STAATLICHE GRAPHISCHE SAMMLUNG MÜNCHEN

- 16 Staatsbibliothek zu Berlin, Fol. xyl. 14. According to Schreiber, 'What is particularly interesting about this pasteprint, however, is that its metalcut was slightly larger than the paste, and that the protruding parts atop and right of the image are not black but rather appear in blue on the paper. Perhaps the latter has been immersed in a liquid intended to serve as binding agent before the paste was applied, thus effecting the colour change'; Schreiber, *Handbuch*, 8:146. Mabbott, who had not seen the pasteprint first-hand, argued on the basis of Schreiber's commentary: 'It occurs to me that this liquid may have been something to prevent the glue base from clinging to the metal – which stained the paper where that [sic] was not protected by the glue'; Mabbott, *Pasteprints*, 72 n. 22.
- 17 Schreiber attributed some of these pasteprints to the workshop of a monogrammist; Schreiber, *Handbuch*, 6: 111, Monogramm 122.
- 18 Schreiber knew only the eight pasteprints kept as part of the print collection at the Germanisches Nationalmuseum, Nuremberg, under K11 to K17 (Schr. 2769, 2777, 2779, 2780, 2781, 2784, 2787, 2802).

described them as prints made with a plate covered in greenish gold and silver reddish-brown paste. A pasteprint from the same workshop of *The Mount of Calvary* (Schr.

All the illustrations that can now be attributed to the *Speculum* manuscript Hs 28607, from which the above-mentioned prints were cut out and which is held in the library of the same institution, are compiled in P. Schmidt, *Gedruckte Bilder in handgeschriebenen Büchern: Zum Gebrauch von Druckgraphik im 15. Jahrhundert* (Cologne: Böhlau, 2003), 429–31. The Erlangen-Nuremberg University Library owns another pasteprint from this series, *Deposition from the Cross*, that is pasted into the *Missale* manuscript Ms 101, fol. 124^v next to the *Te igitur* in the Canon. Regarding this manuscript cf. H. Fischer, *Die Lateinischen Pergamenthandschriften: Katalog der Handschriften der Universitätsbibliothek Erlangen: Neubearbeitungen 1* (Erlangen: Universitätsbibliothek, 1928), 110ff. At the time, Fischer identified this printed illustration as the *Lamentation of Christ*.



FIGURE 6.2 The Mount of Calvary (Schr. 2801), c.1470, pasteprint, 14.3 × 10.8 cm
NUREMBERG, GERMANISCHES NATIONALMUSEUM, K5;
© GERMANISCHES NATIONALMUSEUM, NUREMBERG

2801; Fig. 6.2),¹⁹ corresponding in its format to four pages of the Passion story,²⁰ was described quite differently by Schreiber: 'the blackened plate, partly covered with green ink [...] was impressed on reddish-brown paste';²¹ he casually revised his statements about them in 1929 in a short

overview of the history of pasteprints.²² Erich Kistner, who in 1947 rediscovered sheets of the Passion series in the manuscript Hs 28607 that were not known to Schreiber,²³ noted that their green sections had neither been imprinted nor had metallic dust applied, but were instead in a transparent lacquer-like medium applied by brush.²⁴ Because this led to the hardening and air-sealing of some sections of the pasteprints in question, the green-tinted background and details of the figures' clothing are especially well preserved.

Colour 'Printing' in *Christ in the Winepress*

In contrast to the aforementioned pages supposedly printed in blue or green, Schreiber listed one object that was actually printed in colour ('partly covered in purple ink') and correctly noted that 'While a black lacquer coating of the empty background can frequently be observed, the red colour is a rarity'.²⁵ The pasteprint *Christ in the Winepress* (Schr. 2813; Fig. 6.1) is part of the old collection in the Staatliche Graphische Sammlung, Munich.²⁶ Its motif is closely related to some contemporary copper engravings that, according to Max Lehrs, resemble an exemplar that he ascribed to the Master of St Erasmus.²⁷

19 The area the paste was applied to measures 143 × 108 mm. Originally, this pastepoint was pasted to fol. 59^r of the aforementioned *Speculum humanae salvationis* (Hs 28607), in the library at the Germanisches Nationalmuseum, Nuremberg. It is now stored in the print collection (box 98, K5).

20 Heusinger, *Teigdruck*, 241. In addition to Schr. 2801, Schreiber listed another exceptionally large pastepoint, Schr. 2782 (*Flagellation of Christ*), of which he assumed that the plate was 'printed using green lacquer'; Schreiber, *Handbuch*, 6: 7. Its technique largely corresponds to the pastepoints depicting the Passion story now in Nuremberg, and like Schr. 2801 it was probably made by impressing one of the plates that can be attributed to the aforementioned monogrammist. It is pasted to the inside of the front cover of manuscript Clm 2873 in the Bayerische Staatsbibliothek, Munich.

21 Schreiber, *Handbuch*, 6: 12.

22 'It appears that for the same purpose [i.e. in order to prevent any moist embossing material from clinging to the plate to be impressed on the paste] the plate was sometimes covered with gold foil or *zwischengold* [metal leaf with gold on one side and silver on the other] prior to printing, but then the greenish gold or silver-sheened metallic dust found on a number of pastepoints taken from a Swabian manuscript, now at the Germanisches Nationalmuseum, Nuremberg, was applied after completion of the printing process'; Schreiber, *Handbuch*, 7: 88.

23 Kistner, *Teigdrucken*, 65.

24 Ibid., 74.

25 Schreiber, *Handbuch*, 6: 16, no. 2813.

26 Shelfmark 171460. The pastepoint (104 × 79 mm) is pasted to a leaf (136 × 95 mm) that was removed from a manuscript. Since it was common practice in the nineteenth century to transfer individual prints that were considered exceptional from their original volumes to print collections, it is probable that the leaf was taken from a manuscript that is now in the Bayerische Staatsbibliothek, Munich. The verso is inscribed: 'aus Cod[ex] Ratis[onensis] Civit[atis] /1870/ 173'. I would like to thank Frederike Steinhoff (Fellow, Bibliotheka Herziana), and Ad Stijnman for discussing this pastepoint with me.

27 M. Lehrs, *Geschichte und kritischer Katalog des deutschen, niederländischen und französischen Kupferstichs im xv. Jahrhundert. Dritter Textband: Dritter Abschnitt: Die Anonymen: Erste Abteilung* (Vienna: Verlag der Gesellschaft für vervielfältigende Kunst, 1915), 276–78. For a better understanding of this pastepoint

Although the red colour applied as the final step of the pasteprint process is almost completely preserved, the image is hardly recognisable except in raking light due to changes caused by the aging process. Christ stands facing left under the transom of the winepress, which presses down on his back while he enfolds it with his arms. If one disregards that some copper engravings have reversed images, this is the basic unifying motif. By contrast, here Christ looks over his shoulder directly at the viewer whereas in the engravings his head and the direction of his gaze are both parallel to the transom of the press.

The colour of the printing ink on the Munich page is strongly reminiscent of the purple-coloured wool dust of the flock prints. The substrate that is now dark brown and visible in the embossed contour lines of the picture confirms this association, since the flock print substrates that mimicked a fabric structure now exhibit a comparable coloration either in whole or in part. For example, on the well known pasteprint *St George* (Schr. 2844) the brown tones of the substrate clearly fluctuate between orange-brown and dark grey-brown.²⁸ The contrast between the intense violet-red wool dust and yellow-brown substrate that was probably the original intention is evident on the left third of *St Barbara* (Schr. 2833), which is in the Würzburg University Library. The primer is damaged in these areas so that the 'honey-coloured binding agent layer', with its largely smooth and shiny surface, becomes visible.²⁹ In other places this golden brown resin layer is overlaid by a second stratum with brown pigments that has dried to a brittle dark grey-brown mass. Possibly this 'paste layer' of unspecified material coating the thin tin foil was originally sealed with a transparent varnish or lacquer that darkened over time and thus transformed the pasteprint's appearance. It is well known that the substrate of *St George* (Schr. 2844) was finished with an

orange-coloured stain over metallic foil.³⁰ Applying primers to the paper in layers probably created the illusion of gold, suggesting that these objects imitated precious brocade-like fabric.³¹

To what extent the violet-red pasteprint of *Christ in the Winepress* (Schr. 2813, Fig. 6.1) imitated silver or gold embroidery is unclear.³² It makes use of the same optical effect as the flock prints through the contrast between yellow and intense red, softened by a slight haziness. Nevertheless the contours of the designs would have stood out clearly from the surrounding areas of colour. The darkening of the yellow to brown reduced the disparity between the values of the colours, diminishing the once-striking contrast of light and shade. That contrast was the basis for the impact of pasteprints impressed with black ink on a more or less golden yellow substrate; most now appear as an undefined grey-brown mass. That the only evidence for pasteprints in violet-red has survived on a sheet whose motif is related to the Eucharist may be an accident of survival; many more were presumably produced.

Another pasteprint with the same iconography, Schr. 2813, also shows a band or scroll of writing around the figure of Christ pressing the grapes that is found in the copper engravings. The words of the original text cannot be conclusively determined. The few recognizable text fragments were impressed on the substrate and the text was thus an integral part of the embossing plate. Few other pasteprints with bands of writing are known.³³ The writing on the scroll is an excerpt from Isaiah 63:3 ('*Torcular calcaui solus et de gentibus non est vir mecum*'; New

(Schr. 2813), see the modern copy of a print ascribed to the Master of the Martyrdom of the Ten Thousand (L.III.403.083): <http://www.deutschefotothek.de/obj30108386.html> [permalink, accessed 15 November 2013]. In 1887, 30 copies were pulled from the plate at the Kulturhistorisches Museum zu Lübeck (Kat. 1687), now the St. Annen-Museum. Regarding the plate as well as the modern copies, cf. Lehrs, *Geschichte*, 403ff.

28 Germanisches Nationalmuseum, Nuremberg, K6. Scheld and Damm use this pasteprint as basis for their argument; Scheld and Damm, *Flock Prints*, 317–22.

29 Cf. the conservation report on the Würzburg pasteprints (Schr. 2812 and 2833) at the Institut für Buch und Handschriftenrestaurierung (Institute for Book and Manuscript Restoration) of the Bayerische Staatsbibliothek, Munich, protocol number 6040, p. 7.

30 Scheld and Damm, *Flock Prints*, 318–20.

31 In addition to woodcuts with paste decoration, which reminded Mabbott of 'richly embroidered textile', he also compared flock prints to 'woven fabric'; Mabbott, *Pasteprints*, 57, 66. Scheld and Damm wrote concerning flock prints: 'The paper base was prepared to evoke the three-dimensional character of a woven fabric'; Scheld and Damm, *Flock Prints*, 318. David S. Areford concluded about paste and flock prints that 'the goal was to simulate embroidered and brocade decoration'; D.S. Areford, *The Viewer and the Printed Image in Late Medieval Europe* (Surrey, UK, Burlington VT: Ashgate, 2010), 35.

32 An opinion tending in this direction has been forwarded regarding the exemplar of St John the Evangelist (Schr. 2850), which is also in Munich; Areford, *Viewer*, 35.

33 In addition to Schr. 2813, the following pasteprints feature impressed text fragments in inscription bands or frames: Schr. 2769, 2770, 278.1m, 2805, 2812, 2816.a, 2816.m, 2817, 2817.m, 2821, 2863.x. Two more recent, flimsy pasteprints, whose illustrations cannot be conclusively determined due to their poor condition but which feature bands of writing, are stored at the Erlangen University Library (Cim. P. 5–1 and Cim. P. 5–2).

International Version: 'I have trodden the winepress alone; from the nations no one was with me'), as in many of those engravings. In typology, this verse is the prophecy that Christ will take upon himself the sufferings of mankind and be abandoned by his disciples.

In the violet-red pasteprint, this familiar motif with apparently gleaming golden contours is set against a blood-red background. The red wine pressed by Christ corresponds allegorically to the blood he shed by redeeming mankind through his death, freeing them from all past sins and bringing an end to the Old Covenant while establishing the New. Not only the general motif and colour of this pasteprint, but also the suffering Christ's gaze at the viewer over his shoulder, would have been deeply moving for contemporary viewers and encouraging of their devotion.

Conclusions

Although the coloured substrates used in pasteprinting interact to greater or lesser extents with the tone of the

applied ink, colour-printed pasteprints are very rare. The intensity of the relief-like format characteristic of pasteprints depends largely on the texture of the substrates into which the image is pressed by an embossing plate. The pasteprints Schreiber lists as colour prints had generally been printed in black before being elaborately coloured in the final step, which apparently confounded him. Only one (Schr. 2813) was undoubtedly printed in violet-red, its colouration strongly reminiscent of the coating of flock prints. In its original coloured format, which is only partly discernible due to the materials' ageing process, the family of pasteprints differs considerably from both copper engravings and wood and metalcuts, which were, and are, commonly printed onto a support using black ink. Pasteprints are unusual objects that cannot be connected to any other category, and they seem to have developed along different lines from colour printing proper. However, they attest the diversity of approaches that were used to incorporate colour into multiples in late medieval and early modern Europe, and they represent a significant, if brief, moment in the history of printing with colour, broadly defined.

The Birgittines of the Netherlands: Experimental Printers and Colourists

Kathryn M. Rudy

The transition from manuscript to print technologies was not smooth. This was due in part to the barriers of producing early printed books, which were not only labour-intensive and had high start-up costs (the press, the type, the expertise), but also threatened tradition, which in monasteries might include book-copying as an element of *ora et labora*. But another hindrance to print was its plainness; though it was efficient, the printing press eliminated much of what people sought from their books. As opposed to sumptuous manuscripts on parchment that were decorated with gold and colours, printing was austere, monochrome and usually on paper that came from an inert vegetal source (flax) rather than a once-animated beast. Trading all of these features for cheapness was a hard sell. Moreover, the very cheapness of books threatened the handmade uniqueness that made the manuscript not just an assemblage of text, but a reflection of its owner. If books could be made in multiples, then recipients would have indistinguishable copies. This could never be said of a manuscript, which was defined by its variability. The result of the transition in the decades flanking 1500 was an era of hybrids, books produced to take advantage of the printing press's efficiency while preserving the value – material and social – of the manuscript. This article addresses books made in the period of experimentation before the consolidation of typography in the course of the sixteenth century.

Some of the first results of the early printing were not *fully* printed books, but hybrids. Rather than submitting to total dominance of a new technology over an older one (a concept that our progressive models of history demand that we *a priori* see as not only having occurred, but as necessary and proper), book makers and artists in the early years of the printing press saw the new technology as offering, like the manuscript itself, certain advantages and drawbacks. They selectively used both technologies as needed, in the same book. The results merged prints

and illumination, hand-drawn imagery and machine-produced multiples. Partly at stake were labour, expense and the fact that book owners and producers were loath to forego the realm of decorative colour that illumination had offered. The techniques could themselves be hybrid; stamped (block printed) woodcuts were inked and pressed by hand onto a support. This paper follows contemporary usage and uses 'print' to denote impressions from a matrix, whether made with manual pressure (i.e. stamped) or in a printing press. The Birgittines of the Netherlands experimented with a new way of making books in which extraordinary colour was used to bridge the gap between print and manuscript. They aimed these books at their own members, who were defined by prayer and ritual as stipulated by the rather uniform breviary from which each member prayed. However, it was not the rather uniform prayer text that they printed, but rather its more unscripted imagery. The woodblocks used for these books were recycled from earlier projects and were not made expressly for these breviaries. Using these blocks represents, I believe, an experiment.

Whereas usually the main argument for printing is multiplication, here, I believe, the motivation was to introduce figurative imagery without having to develop extensive skill in mastering drawing. The Birgittines were not necessarily making an edition, but might have been testing the possibilities of a new technology. Not only printed books but also manuscripts benefitted from the printing/handmade hybrid, as suddenly any manuscript – even a relatively low-end one – could have illustrations. In the second half of the fifteenth century, conventual ateliers began experimenting with techniques for providing instant illuminations to manuscripts. This happened especially in the eastern Netherlands, where manuscript makers stuck printed images into manuscripts, then painted around them. Ursula Weekes has shown the extent to which pasting paper prints into parchment manuscripts occurred around Arnhem.¹ The next generation of experiments went further: during the first decade of the sixteenth century, one of the Birgittine monasteries in

I thank James Marrow for bringing the Rio manuscript to my attention and for providing images of it; Maggs Brothers (London) for providing images of the other breviary; Jan Willem Klein for information regarding early printing at the religious houses of Gouda; and Lisa Regan for her thoughtful comments on a draft of this paper.

1 U. Weekes, *Early Engravers and their Public: The Master of the Berlin Passion and Manuscripts from Convents in the Rhine-Maas Region, c.1450–1500* (London: Harvey Miller, 2004).

the Northern Netherlands began commissioning, or possibly producing, Psalter-Breviaries that combined the old way of writing the texts (in manuscript) and a new way of contributing the images (as prints), stamping the latter directly onto the parchment text leaves.² Two of these manuscripts survive, but they have not been studied, because one is ensconced in a private collection, and the other is in a little-explored South American collection (Rio de Janeiro, Biblioteca Nacional, Ms. 50.3.19).³ However, they are important witnesses to the development of printing and the use of colouring in that process. One could see these Birgittine books as manuscripts with the production of their illustrations partly mechanised, thus still 'normal' manuscripts. However, they offer a different trajectory for understanding the adoption of the printing press as it not only proceeded simultaneously with the manuscript tradition, but indeed mated with it.

Other Early Experiments in Manuscripts, Printing and Colour

The creation of such hybrids posed peculiar problems that might be eliminated in later, single-medium books. As the convents around Arnhem and other experimenters in Northern Europe and England in the second half of the fifteenth century found, prints on paper do not take colour or gilding particularly well.⁴ Such is the case in the often-reproduced English manuscript on parchment from c.1490 with a hand-painted woodcut printed on paper depicting Christ as Man of Sorrows, pasted onto a folio dyed deep red and painted with repeated wounds in shiny viscous paint of the same colour (British Library, Egerton 1821).⁵ The parchment border throbs with immediacy. In the printed image, in contrast, the watercolour washes are dully absorbed into the fibre of the paper. Colouring on paper had its limitations. This mismatch of media could create tension within the book specifically in the realm of colour.

One solution to this problem was to eliminate colour entirely from the print and relegate it to the parchment mount.⁶ But other artists experimented with a different solution: printing directly on parchment, a material that takes the colour well and can withstand the wear when gold is applied to its surface and burnished vigorously. Printing made images more available since a mechanically reproducible image does not require that the book printer has a draftsman's skills. Combining techniques in this way presumably brought costs down while maintaining a homogeneous material (parchment) allowing for sumptuous colour. One manuscript with a full cycle of woodcut images printed on parchment has been dismantled; the individual leaves are in the British Museum (1856,1011.1–28).⁷ In recent history they were pasted onto cardboard mounts, and consequently the text on the versos cannot be read. It is clear, however, that the woodcuts originally formed a cycle in a small prayerbook and that the texts and images were planned to fit together from the outset. A painter has carefully coloured in the printed lines with modulated bodycolour and then gilded some areas, including all the haloes, to make the prayerbook resemble an illuminated manuscript.

While a variety of book producers used print-script hybrids, the Birgittines in particular developed the print medium to suit the specific needs of their order, both in terms of their collective identity and, relatedly, their particular prayer practices. Their commitment to printing is signalled by their experimentation with a type of single-leaf print that served as corporate identity cards for use both within and without the convent walls. The largest output of such conventual calling cards comes from the convent of Mariënwater, a Birgittine monastery in Rosmalen, just outside Den Bosch in Brabant, near what is now the Dutch-Belgian border. Nuns in the convent of Mariënwater either produced prints themselves or commissioned prints to give away or to sell as souvenirs at their convent.⁸ The sisters in Rosmalen specified the name of their monastic house on the print, which 'branded'

2 P. Jenkins, 'Printing on Parchment or Vellum', *The Paper Conservator* 16 (1992), 31–39.

3 The only notice for this manuscript appears to be in P. Herkenhoff, *Biblioteca Nacional: A História de uma Coleção* (Rio de Janeiro: Salamandra, 1996), 29, where the manuscript is called a Psalter and Book of Hours and fol. 1 is reproduced.

4 D. Oltrogge, 'Illuminating the Print: The Use of Color in Fifteenth-Century Prints and Book Illumination', in *The Woodcut in Fifteenth-Century Europe*, ed. P. Parshall, Studies in the History of Art 75 (Washington, D.C.: National Gallery of Art, 2009), 298–315.

5 For this manuscript, see D.S. Areford, *The Viewer and the Printed Image in Late Medieval Europe*. Visual Culture in Early Modernity (Burlington, VT: Ashgate, 2010), 76–80, with further references.

6 Such is the case with a manuscript prayer book copied on parchment, with the 'Large Passion' engravings by Israel van Meckenem pasted onto the folios at major text openings, and marble borders painted around them on the parchment substrates (London, British Museum 158 b 1*).

7 For images, see 1856,1011.1–28. Schreiber describes them as numbers 127, 161, 174, 197, 221, 215, 238, 231, 268, 252, 296, 323, 331, 285, 247, 350, 656, 662, 676, 447, 499, 509, 528, 690, 543, 551, 558, 569.

8 See U. Weekes, 'Convents as Patrons and Producers of Woodcuts in the Low Countries around 1500', in *The Woodcut in Fifteenth-Century Europe*, ed. P. Parshall, Studies in the History of Art 75 (Washington, D.C.: National Gallery of Art, 2009), 259–75, with further references.

their convent. For example, one shows Mary (the convent's patron saint) flanked by female saints, above a prayer ending with the words *Geprent tot Mariënwater* (Printed at Mariënwater).

The Birgittines, especially those at Mariënwater, were equally committed to print and manuscript. What holds their manuscript and print efforts together is an interest in extravagant colour across media, primarily in the margins of their manuscripts, on paper and parchment and in script and print. They may have been the ones who painted these prints on paper, but the pigment is never quite as vibrant as the colours on painted parchment.

Birgittine Psalter-Breviaries

Late medieval Netherlandish Birgittines created a particular kind of prayerbook, the Birgittine Psalter-Breviary, which combined a calendar (with feast days for all Birgittine saints), a full Psalter and certain standard texts for the liturgical hours exclusive to the Birgittines. At least fourteen survive from the Netherlands. The nuns probably wrote and illuminated these Psalter-Breviaries themselves with exuberant and distinctive decoration, despite not being professionals. The sisters at Mariënwater, who have been particularly well studied, developed a particular type of penwork border decoration with multi-coloured lines forming repeated geometrical shapes and 'rivers'.⁹ Moreover, they developed some stock motifs to mark the incipits of major texts. A wheel motif, for example, appears in many of the manuscripts probably produced there.¹⁰ Another repeated motif turns the page into the body of Christ with his heart at the centre of the letter and his punctured hands and feet sticking out and bleeding into the margins (Fig. 7.1). This highly colourful treatment of the page exemplifies how the Birgittine nuns, due to their limited artistic training, minimised the human figure to the point of eliding his invisible body with the text.

9 For images of Leyden, University Library, BPL 2856, a Psalter made at Mariënwater, search for 'BPL 2856' at https://socrates.leidenuniv.nl/R/?func=search-simple&local_base=genoi-disc (accessed 15 November 2013). On the regional specificity of decoration in the Northern Netherlands, see A. Korteweg ed., *Krieziels, aubergines en takkenbossen*, exh. cat., Rijksmuseum Meermanno-Westreenianum/Koninklijke Bibliotheek, The Hague (Zutphen: Walburg Pers, 1992).

10 U. Sander Olsen, 'Handschriften uit het Birgittinessenklooster Mariënwater te Rosmalen bij 's-Hertogenbosch', in *Serta devota in memoriam Guillelmi Lourdaux*, ed. W. Verbeke, Mediaevalia Lovaniensia, Series I, Studia 20–21 (Leuven: University Press, 1992–95) II, 225–54.



FIGURE 7.1 Folio with Christ's heart in the initial and his wounds in the margins, from a Psalter-Breviary made at the Birgittine Monastery of Mariënwater in Den Bosch, c.1460–1480
AUXERRE, TRÉSOR DE LA CATHÉDRALE: MS. 13, FOL. 253^v

Because the convent of Mariënwater distinguished itself with both manuscript and print production, and because a large number of manuscripts from this convent survives – indeed, the convent itself remains as a residence for a few remaining nuns – scholars have been too quick to attribute other Birgittine manuscripts to Mariënwater, when in fact there were six other Birgittine convents that also made manuscripts. All were dedicated to Mary.¹¹ Several were in the vanguard of experimenting with early printing and in combining it with manuscript, in some cases even collaborating with

11 Namely, Mariënwater/Koudewater, Rosmalen; Mariënwijngaard, Utrecht; Mariënkamp, Kampen; Mariënborg, Soest; Mariënsterre, Gouda (Double convent); Mariëntroon/Maria Troon, Dendermonde; and Mariënboom, Kleef.

masters of the new technology while retaining the tradition of manuscript writing.¹²

The Hybrid Psalter-Breviary

The themes explored above (the Birgittines as experimental printmakers, a tension between printed and hand-written elements in the book, and a quest for a surface that takes pigment without drinking it) come together in two Birgittine Psalter-Breviaries that have recently come to light. They should have a central place in the history of printmaking, but neither is particularly accessible. One is in Rio de Janeiro, Biblioteca Nacional, and the other has been secreted away in a private collection.¹³ I will refer to these as *Rio* and *Olim Maggs*,¹⁴ respectively.

Both are hand-written on parchment and so scantily decorated that only the incipit folios of the major text

¹² For a study about one such collaborations, see H. van Asperen, 'Praying, Threading, and Adorning: Sewn-in Prints in a Rosary Prayer Book (London, British Library, Add. MS 14042)', in *Weaving, Veiling, and Dressing: Textiles and their Metaphors in the Late Middle Ages*, ed. K.M. Rudy and B. Baert. *Medieval Church Studies* (Turnhout: Brepols, 2007), 81–113; for a study of a Birgittine manuscript with prints enhancing a devotion to a virtual pilgrimage (London, British Library, Add. Ms. 31001), see K.M. Rudy, *Virtual Pilgrimages in the Convent: Imagining Jerusalem in the Late Middle Ages*. *Disciplina Monastica*, vol. 8 (Turnhout: Brepols, 2011), 175–92, 399–410.

¹³ I studied the latter when it came up for sale at Maggs in London, but have only studied the *Rio* manuscript from the slides kindly provided to me by James Marrow. I am also grateful to him for his description of the manuscript. For a thorough description of a Birgittine Psalter-Breviary, see Peter Kidd's description of Oxford, Bodleian, Ms Buchanan f. 2, available online (<http://www.bodleian.ox.ac.uk/dept/scwmss/wmss/medieval/mss/buchanan/f/002.htm>, accessed 15 November 2013).

¹⁴ Rio de Janeiro, Biblioteca Nacional, Ms 50.3.19. Manuscript on parchment, 199 folios, 224/226 × 150 mm. Frame ruled (not lined) in gray for 23 to 25 lines per page, c.142 × 89 mm. Contains a Psalter (1^r–100^v); Breviary (112^r–189^r); Calendar for the diocese of Utrecht (191^r–199^r, which was originally at the beginning of the book), an Office of the Dead of Brigittine Use (104^v–110^v), and a Litany with a cluster of Brigittine saints (101^r–104^v). Olim Maggs Bros., London. Manuscript on parchment, 206 folios, 222 × 145 mm, written in 1 column, text block 142 × 89 mm. Written c.1500–1510 in The Netherlands. Frame ruled (not lined) in dark grey ink for with 23 or 24 lines per page. Contains a Birgittine Calendar (2^r–8^v), Psalter (9^r–108^v), Breviary (111^r–189^v), Office of the Dead of Brigittine Use (190^r–198^r), litany (198^r–200^v, in which the name *Dorothea* has been stroked in red on 199^r, which may refer to the book's original user).



FIGURE 7.2 Incipit of the Psalter with an initial B containing a printed Virgin of the Sun and printed borders, all hand-painted, from a Psalter-Breviary made for the Birgittine Monastery of Mariënsterre in Gouda, c.1500
OLIM MAGGS, LONDON, FOL. 9^r; COURTESY OF MAGGS, LONDON

openings, the Psalter and the breviary, have received abundant decoration. The two large historiated initials (Figs. 7.2–7.5) that open the major texts in each manuscript have been created with hand-coloured woodcuts that were printed directly onto the parchment. The burst of decoration in each book marks the beginning of the Psalter (*Beatus vir*), and the Birgittine breviary, which commences with readings for Trinity Sunday. Although similarities of size, layout and structure indicate that the same team produced both books, they differ in their printed imagery and approach to border decoration. These differences suggest that the two manuscripts were experimental efforts rather than standardised products of a streamlined operation. They represent two attempts at enhancing a hand-written book with mechanically produced images. Although the



FIGURE 7.3 *Incipit of the Breviary with an initial T containing a printed Trinity, and printed borders, all hand-painted, from a Psalter-Breviary made for the Birgittine Monastery of Mariënsterre in Gouda, c.1500*
OLIM MAGGS, LONDON, FOL. 111^r; COURTESY OF MAGGS, LONDON

script in the two manuscripts is similar, and both use woodcuts printed directly on the parchment to form historiated initials, they use different wood blocks and have a different mise-en-page. The books are unusual enough in a similar way that they very likely share a single origin – but whoever made them seems not to have been able to settle on a single set of forms.

Both manuscripts contain two decorated folios, printed historiated initials on otherwise hand-written pages. *Olim Maggs* has a depiction of the Virgin of the Sun in the initial *B(eatus vir)* to mark the incipit of the Psalms; and an initial *T(rinum deum)* filled with a printed image



FIGURE 7.4 *Incipit of the Psalter with an initial B containing a hand-painted printed image of David in Prayer, with penwork borders in a style associated with South Holland, from a Psalter-Breviary made for the Birgittine Monastery of Mariënsterre in Gouda, c.1500*
RIO DE JANEIRO, BIBLIOTECA NACIONAL, MS 50.3.19, FOL. 1^r; IMAGE COURTESY OF JAMES H. MARROW

depicting the Trinity (*Genadenstoel*, or Throne of Mercy) at the incipit of the Breviary. The decoration in *Rio*, on the other hand, has a printed penitent David and a Trinity, respectively. All four images are printed from woodblocks in black ink, then painted in bodycolour and touched in gold within their respective letters, *B* and *T*. The letters themselves have been painted in bodycolour but not over printed lines. Whereas an image of the Trinity logically introduces Trinity Sunday and the Psalmist David often introduces the Psalms, the Virgin of the Sun is highly unusual as a prefatory image for the Psalms, a point to which I shall return.

The decoration around the borders in the two manuscripts also differs. *Olim Maggs* attempts new kinds of



FIGURE 7.5 *Incipit of the Breviary with an initial T containing a hand-painted printed image of the Trinity, with penwork borders in a style associated with South Holland, from a Psalter-Breviary made for the Birgittine Monastery of Mariënsterre in Gouda, c. 1500*

RIO DE JANEIRO, BIBLIOTECA NACIONAL, MS 50.3.19, FOL. 112^r; IMAGE COURTESY OF JAMES H. MARROW

‘printed’ decorations (stamped borders), whereas *Rio* has traditional penwork borders. From their first attempt to their second, they found a way to speed up the process by mechanising even the application of border decoration. The borders around both decorated pages consist of repeated woodcuts stamped end-to-end to form a frame, some misaligned and some upside down. The technique created plenty of black background, so that a painter could colour in the ‘white’ areas quickly by brushing thin washes that slop over the edges. While repeated stamped borders were more common in Italian prints of the late fifteenth century, they appear infrequently in the north,¹⁵ and very rarely as the basis of otherwise hand-painted page borders in Italian incunabula.

Applying these washes was done in a separate campaign of work from the painting of the initials, and this early approach to mechanising the production of colourful images was not yet under their control.

Just as the ‘rivers’ penwork and the wound motifs helped to localise some Psalter-Breviaries to the convent of Mariënwater, the ‘Aubergine’ penwork decorating *Rio* localises the manuscript production to South Holland.¹⁶ The only Birgittine convent in that region was the double convent of Mariënsterre in Gouda. They are likely candidates as recipients, if not producers, of these manuscripts. The convent in Gouda was quite young, having only been founded in 1476,¹⁷ so one can imagine that it was anxious to fill its members’ hands with the standard and defining guide to daily prayer for the Birgittines.

A third early manuscript-print hybrid was made in Gouda. Namely, a missal made in South Holland (The Hague, KB, 135 H 45) contains a similar solution to the problem of introducing imagery to the hand-written book: a printer has filled the *T* of *Te igitur* at the incipit of the Canon of the Mass with a woodcut depicting the Trinity.¹⁸ Remarkably, an image of the Trinity was printed directly on the page to commence the text (f. 102^r),¹⁹ and it is the same woodcut as that used in the *Rio* manuscript. The missal, however, is not Birgittine; rather, it has a Franciscan calendar and a note of ownership indicating *Pro conventu fratrum minorum in gouda diocesis traiectionensis* (For the convent of friars minor in Gouda in the diocese of Utrecht). The Franciscans apparently made or commissioned the manuscript c.1460–80, and replaced the Canon (the text at the centre of the book) in the 1490s. Because the Canon is the only part of the book that is used for every mass, it wears out more quickly than the rest of a missal. A scribe or team therefore replaced it, swapping an

15 Stamped borders appear on London, British Museum, 1822.122.18 (*St Dorothy*).

16 For ‘river’ penwork, see A. Korteweg ed., *Krieziels*, p. 161, cat. 153–55.

17 Their short (2-folio) foundation document is one of the few manuscripts that survives, and it does not mention printing. Gouda, SAHM: Kloosterarchieven, 183. It is reproduced at <http://issuu.com/goudaopschrift/docs/brigitta?e=5220348/1936431> (accessed 15 November 2013).

18 I. Kok, ‘Een houtsnede in een handschrift’, *Manuscripten en miniaturen: Studies aangeboden aan Anne S. Korteweg bij haar afscheid van de Koninklijke Bibliotheek*, ed. J. Biemans (Zutphen: Walburg Pers, 2007), 231–42.

19 For images, a complete description, and up-to-date bibliography, search <http://manuscripts.kb.nl/> for ‘135 H 45’ (accessed 15 November 2013).

old, worn-out quire for a one made with the newest hybrid technique.

The Aubergine penwork in the new sections indicates that work was carried out in Gouda. Ina Kok has shown that Gerard Leeu of Antwerp – formerly active as a typographic printer in Gouda from 1477 to 1484 – first owned this woodblock and used it in various projects in the 1480s and 90s.²⁰ After his death in 1493, his property, including his woodblocks, was dispersed, and some of the blocks ended up in Gouda, probably in the atelier of the convent of the Collatiebroeders (Brothers of the Common Life) dedicated to St Paul. The Collatiebroeders continued typographic printing in Gouda after Gerard Leeu had left the town, and they were apparently eager to obtain sets of blocks. They printed indulgences, schoolbooks and books of hours and also took commissions. It would seem that they would work for anyone. Kok ascertains that they printed the Trinity that was later added to the Franciscans' Canon after June 1495. They might have first trimmed the woodblock before printing so that it would fit in the small oval initial, or else they masked it with a frisket. The Collatiebroeders appear also to have been behind the Birgittine Psalter-Breviaries in addition to the Franciscan missals. The fledgling house of Birgittines, with a great need for books but slight experience in printmaking, must have turned to the highly productive and relatively indiscriminate Collatiebroeders, who printed for them the same image of the Trinity, trimmed or masked for the Franciscans' Canon, that was inserted into *Rio*. The new size was appropriate to the Franciscan manuscript but not a great fit in *Rio*. In addition to indicating a *terminus post quem* of 1495 for *Rio*, this shared image also indicates an origin for the colours in the manuscript: the thin colouring in the missal does not resemble the bold bodycolour in *Rio* and *Olim Maggs*, meaning that the Collatiebroeders printed onto blank parchment in these manuscripts and the colour was added later, not necessarily in the Collatiebroeders' atelier.

The woodblock depicting David had a similar lifecycle. Gerard Leeu printed a complete version of the block depicting *David in Prayer* in *Glose ofte expositie opten psalm Miserere* (Exposition on the Psalm *Miserere*) in Antwerp on 2 December 1491 (Fig. 7.6). This was printed in two versions, with and without a frame (which may

have comprised a separate block).²¹ Shortly thereafter, it was brought to Gouda, masked or cut down, and used as an initial in the *Rio* manuscript. It is striking how thinly the image was coloured in the Antwerp incunable printed on paper, and how richly saturated the colours appear in the *Rio* manuscript. This apparent difference is partly due to a change in substrate, as parchment takes the colouring without drinking it, and partly due to the desire to make *Rio* resemble a richly painted manuscript.

The Collatiebroeders in Gouda also published a popular guide to the Mass, Gerrit van der Goude's *Boexken van der missen*, in 1506.²² The booklet begins with a large woodcut print depicting the Virgin of the Sun. Now we can understand the unusual inclusion of this image in *Olim Maggs*: the brothers reused this block for the historiated *B*. In the Birgittine breviary, however, the image was printed without its rectangular frame. Because the printer was anticipating an elaborate painted frame, he either cut it down or masked it. The pattern here is the same: the brothers in Gouda acquired second-hand woodblocks (primarily from Antwerp), cut them down in order to repurpose them, and used them to print directly onto parchment, which will be then inscribed by hand.

At this point it is possible to lay out a fairly complex sequence of events that led to the constellation of hybrid images. The Collatiebroeders, it would seem, printed images into at least one Franciscan missal and two Birgittine Psalter-Breviaries after 1495, and probably after 1506. But the colouring in the books differs so much, with the missal's woodcut painted in thin washes and the Birgittines' books in bold bodycolour, that it may have been added elsewhere. The Virgin of the Sun in *Olim Maggs* makes it clear that the process, although semi-mechanised, was still labour-intensive. This folio could have been made as follows: first, the Collatiebroeders printed the masked (or trimmed) block onto a blank parchment bifolio (to create the image of the Virgin of the Sun) with their printing press. Then, they 'printed' the border with repeated stamps made of carved wood. Then, perhaps, the bifolium moved to a different studio, where it was hand-coloured. This may have occurred in the Birgittines' convent. The various parts of the page demanded that different kinds of paint be

20 For example, Leeu published the first state of the *Genadenstoel* in a printed Book of Hours (Antwerpen, 27 July 1489, fol. 16^v). Interestingly, he printed this book on parchment (San Marino, Huntington Library); see Kok, *Houtsnede*, 235, fig. 1.

21 W.G. Hellinga, *Copy and Print in the Netherlands: An Atlas of Historical Bibliography* (Amsterdam: North-Holland Publishing Company, 1962), pls. 30, 31 demonstrates this point.

22 Nijhoff, W. and M.E. Kronenberg, *Nederlandsche bibliographie van 1500 tot 1540*, 3 vols. in 8 (The Hague: Martinus Nijhoff, 1923–71), no. 985. P.L. Mees, 'Notities bij de drukken van Gherity vander Gouda's Boexken van der Missen', *Het Boek* 35 (1961), 1.



FIGURE 7.6 David in Prayer. Frontispiece to *Die Glose oft expolicie opten psalm Miserere mei Deus secundum magnam misericordiam tuam* (Antwerp: Gerard Leeu, 2 December 1491)

THE HAGUE, KONINKLIJKE BIBLIOTHEEK, 150 F 20:2; IMAGE COURTESY OF THE KONINKLIJKE BIBLIOTHEEK/ THE NATIONAL LIBRARY OF THE NETHERLANDS

mixed: diluting the watercolour paint would make it more transparent; adding more gum would make it more shiny; mixing it with white chalk powder would give it more hiding power with a mat surface.²³ The painter filled in the 'negative space' of the stamped borders quickly with thin washes and carefully coloured the Virgin of the Sun with semi-transparent paint, and painted other non-printed areas with watercolour made opaque with chalk (for example: the letter *D* around the figure and the green grass denoting the landscape that makes the Virgin appear to hover above the ground). Someone gilded the haloes and

other details. Someone, perhaps a scribe, outlined the written area and the initial in red ink. The scribe then wrote the text in black ink with a pen on unlined parchment.

I draw two conclusions from this layered process. First, making this page required many steps involving two types of printing and at least three different viscosities of paint, each applied with a different technique. Secondly, the order of operations is the complete inverse of traditional manuscript-making technique, which begins by ruling the page, then inscribing the letters, and only *then* applying the border decoration and painted figures.

Now I return to the unexpectedness of the Virgin of the Sun as a prefatory image for the Psalms. As I have argued here, the two hybrid Psalter-Breviaries were probably printed under the direction of the Birgittines in Gouda, but likely in the studio of the Collatiebroeders. I suspect that they made *Rio* first, with an image of David at his harp surrounded by penwork decoration typical of Gouda. For their second attempt, they made a few adjustments and

23 T. Primeau, 'The Materials and Technology of Renaissance and Baroque Hand-Colored Prints', in S. Dackerman, *Painted Prints: The Revelation of Colour* (Baltimore: The Baltimore Museum of Art; University Park, PA: Penn State University Press, 2002), 49–78, esp. 67 (although he mistakenly writes that adding chalk would increase the transparency of a pigment).

produced *Olim Maggs*. This time they wanted to abandon the labour-intensive penwork, achieve exuberant colour borders through mechanical means and 'brand' the product. To do so, they ordered an image of the Virgin of the Sun in the space of the first initial instead of David. The Birgittines' convent was called Mariënsterre, which means 'Mary of the Star'. By replacing the image of David with one depicting Mary in this guise, they were asserting their corporate identity at the beginning of the book. This implies that the version with David was an initial proof to be 'improved' by an image of Mary, and printed borders, for the edition. By painting and gilding it emphatically, they displayed multiple novel techniques for introducing colour and imagery into an otherwise sober book, and at the same time put their conventual stamp upon the first folio.

Conclusion

Shortly after 1500, the Birgittines experimented with applying printing, in a limited way, to the Birgittine Latin

Psalter-Breviaries, the book that helped to define them as an order. Two of the resulting books survive. They reveal an experimental method of constructing a book, which presents old and new techniques side-by-side. Most other examples of images inserted into handwritten books demonstrate how bookmakers pasted prints into manuscript. These two Psalter-Breviaries are exceptional in that the images for the woodblock 'historiated initials' were not pasted in, but stamped directly with black ink on the ruled parchment bifolia, then hand-coloured inside elaborate hand-painted capitals. Not only that, but the borders around one of these incipits have been 'printed' with a series of stamps that are also hand-coloured. The experiments ensured that the Birgittine inmates, without excessive training, could produce brightly coloured figurative imagery. The stamping in black is a form of mechanisation, but the application of colour is still done manually thus is not mechanised. This represents a step toward mechanising the application of colour in printmaking just before actual colour printing became more practised.

PART 3

The Renaissance in Colour, c.1476–1600



A Printer's Art: The Development and Influence of Colour Printmaking in the German Lands, c.1476–c.1600

Elizabeth Savage

The corpus of colour prints from the early modern German lands has long numbered around eighty, and the standard narrative of the development of colour printmaking there varies by academic discipline. Bibliographical studies often refer to book illustrations of the 1480s and 1490s from the workshop of Erhard Ratdolt,¹ which are often minimised as a 'precursor' or 'step towards' more sophisticated artwork. Art histories comprise the majority of the literature, typically considering only the single-sheet prints of the 1500s² (specifically 1507–c.1572) and the two or three artists per generation who designed them. And individual impressions of faux intarsia panels, which were designed to be pasted onto wooden furniture, have been assessed in terms of their decorative applications because they generally fall under the decorative arts rather than graphic art. German colour prints have thus been understood as rare oddities or exceptional treasures in the long sixteenth century, a crucial formative period for the emerging technology of printing. However, new research indicates that those of the highest quality may have been very unusual and special indeed, but the technical advance itself was not. Instead, hundreds of colour-printed images were produced nearly continuously in the German-speaking lands from shortly after 1500. Thousands, if not tens of thousands, of individual colour impressions were in circulation in the long sixteenth century.³

Almost all of these prints have been described as 'normal' woodcuts, but their printed colour hides in plain

sight because no standard cataloguing language exists to record it. The title of the only illustrated census, the first part of the German half of Walter Strauss's *Chiaroscuro* (1973), highlights this impediment to research. Few of the entries are in the tonal style associated with that Italian style of drawing or colour woodcut, but 'chiaroscuro' is the only term available to refer to early modern colour printing. It has been widely adopted because there is no historically appropriate term. 'Chiaroscuro' was used in Italian only from 1516 and only in reference to those that imitate Italian chiaroscuro drawing, and in German prints were instead described in terms of their materials and techniques until the early eighteenth century.⁴ As Claus Kemmer noted, if Joachim von Sandrart could have used a less awkward phrase in 1675 than 'the technique of printing with three blocks in yellow and white, or blue and white, not least from black and white, [printing] the shadows and also the highlights through woodblocks', he presumably would have.⁵ Now, colour printing techniques besides chiaroscuro are rarely recorded, rendering the printed colour effectively invisible to research.

This study presents findings from object-based research into about 2,000 impressions of over 400 woodcuts printed in the German-speaking lands during the first wave of colour printmaking, from the introduction of colour-printed images c.1476⁶ until intaglio techniques

1 K. Schottenloher, *Die liturgischen Druckwerke Erhard Ratdolts aus Augsburg, 1485–1522*, Sonder-Veröffentlichungen der Gutenberg-Gesellschaft 1 (Mainz: Gutenberg-Gesellschaft, 1922).

2 W.L. Strauss, *Chiaroscuro: The Clair-obscur Woodcuts by the German and Netherlandish Masters of the XVI and XVII Centuries: A Complete Catalogue with Commentary* (London: Thames and Hudson, 1973), published simultaneously as *Ibid.*, *Clair-Obscur: Der Farbholzschnitt in Deutschland und den Niederlanden im 16. und 17. Jahrhundert* (Nuremberg: Carl, 1973).

3 A broader discussion of this material will be presented in E. Savage, *Vivid Prints: Colour Printmaking and the Transformation of Visual Information in Early Modern Germany, 1476–ca. 1600* (in progress). This study considers impressions printed only on paper or parchment, not on fabric.

4 See N. Takahatake, 'Ugo da Carpi's *Diogenes*', this volume, 116; A. Stijnman and E. Savage, 'Materials and Techniques', this volume, 5.

5 'Abdrücke daß die Art mit dreyen Stöcken in gelb und Weiß oder blau und weiß wie nicht weniger von schwarz und weiß durch Holzstöcke die Schatten wie auch die aufhochende Liechte zu drucken.' J. von Sandrart, *Teutsche Academie der Bau, Bild- und Mahlerey-Künste* (Nuremberg: 1675), Book III, Part II, Chapter II, 219. See C. Kemmer, *Von Cranach bis Baselitz: Meisterwerke des Clair-obscur-Holzschnitts*, exh. cat. (Braunschweig: Herzog Anton Ulrich-Museum, 2003), 12.

6 On an engraving issued in two colours before Erhard Ratdolt's famous 'invention' of colour printmaking in the 1480s, see A. Stijnman and E. Upper (now Savage), 'Color Prints before Erhard Ratdolt: Engraved Paper Instruments in Lazarus Beham's *Buch von der Astronomie* (Cologne: Nicolaus Götz, c. 1476)', *Gutenberg-Jahrbuch* (2014), 86–105.

superseded woodcut after 1600.⁷ By discussing the prints' materials and techniques, summarising the three distinct functions in this expanded corpus and indicating the international context of production and artistic influence, it argues that colour printmaking was not rare and special but, at least in certain categories of material, a common element of book, print and visual culture.

Materials and Techniques⁸

From humble bi-colour Zodiacal Men in almanacs to multi-colour *tours de force* glittering with printed gold and six other colours, these woodcuts all were made in the same way. They were printed in register (i.e. through the superimposition of impressions of multiple matrices, each inked in a different colour). The vast majority involved two matrices (usually an independent key block and a tone block), but the most complex had seven. I am aware of only three that were printed through the superimposition of impressions of the *same* matrix, each in a different colour and with different areas of the woodblock masked with a frisket sheet (a customised cover that protects the unprinted area of the printed sheet during printing) (see Fig. 2.13 above).⁹ Scholars have struggled to determine which prints satisfied which varying, idiosyncratic definitions of 'German chiaroscuro' or 'false chiaroscuro', particularly in the early and mid-twentieth century, but that style is irrelevant to all but a very few of these prints.

The dissemination of colour printing in the German lands has been described as puzzlingly sporadic and linked to experiments by *artists* in leading printing centres. But when book illustrations are considered, there was a sustained production in even minor, far-flung, one-press towns across the German-speaking lands (including

Switzerland). As per new research into colour printmaking in sixteenth-century Italy and the seventeenth-century Netherlands, it seems that knowledge of the materials and techniques of colour printing was both disseminated and independently (re-)invented by (mostly) *printers*, including German immigrants, in many areas.

Book Illustrations and Broadside (1487–1600s)

The modern division of early modern printed material into art in print collections and books in libraries means that book illustrations and broadsides are generally discussed in bibliographical studies and single-sheet prints in art historical literature. Histories of early modern colour book illustrations rarely mention their single-sheet counterparts.¹⁰ Many discuss only Ratdolt's late medieval woodcuts in Augsburg in the 1480s and 1490s or leap from them to Antwerp in 1557, when Hubert Goltzius produced a book whose title celebrated its 100-plus '*imagines, colorum distinctione, pictorio penicillo delineauit*' (pictures, with the distinction of colour, drawn with the artist's little brush); these two- or three-colour illustrations combined etched designs and woodcut tone blocks.¹¹ Single-sheets are generally categorised as *chiaroscuro* and therefore essentially different in nature from the book illustrations. This may be true for the style (of course, there are exceptions), but they were made from the same materials and techniques on the same presses by the same designers and producers, sometimes for the same markets.

As digitisation brings an increasing quantity of images to light, scholars have begun to reject the dichotomy based on artistic style (medieval book illustrations with flat areas of colour vs. early modern/Renaissance single-sheets with three-dimensional effects) and adopt a more holistic view based on printing technique.¹² This is in

7 Details of individual impressions will be presented in E. Savage, *Vivid Prints: Colour Printmaking and the Transformation of Visual Information in Early Modern Germany, 1476–c.1600* (in progress for 2016).

8 For the historical context, see E. Savage, 'Colour Printing in Relief', this volume, 23–41.

9 This technique was far more common outside the German-speaking lands, but these woodcuts are effectively unknown as colour prints. For a technical explanation, see E. Upper (now Savage), 'The Earliest Artefacts of Colour Printmaking in the West: Red Frisket Sheets, c.1490–1630', *Papers of the Bibliographical Society of America* 108, no. 4 (December 2014): 477–522; On its applications for printing images, see the section 'Masking with the Frisket Sheet' in the exhibition E. Upper (now Savage), 'Tudor Colour Printing', *Cambridge University Library Exhibitions* (Cambridge University Library, December 2013–January 2014), accessed 15 January 2014. <https://exhibitions.lib.cam.ac.uk/tudorcolour/case/masking-with-the-frisket-sheet/>.

10 A notable exception is R.M. Burch, *Colour Printing and Colour Printers* (London: Pitman, 1910; rpt. Edinburgh: Harris in association with Hilger, 1983). On the difficulty of addressing images in bibliographical research, see R. Gaskell, 'Printing House and Engraving Shop: A Mysterious Collaboration,' *The Book Collector* 53 (Summer 2004): 213–251.

11 For incunable illustrations, see E. Savage, *Colour Printmaking*, in G. Prickman, *Atlas of Early Printing*, atlas.lib.uiowa.edu, forthcoming Summer 2015. A small number used woodcut key blocks rather than etched keyplates. H. Goltzius, dedication to H. Goltzius, *Vivae omnium fere imperatorum imagines* (Antwerp: Copenius, 1557), fol. *2; see E. Wouk, "Divine, August and Immortal", this volume, 151.

12 Two recent exhibition catalogues call for a sea change: M. Grimm, C. Kleine-Tebbe and A. Stijnman, *Lichtspiel und Farbenpracht: Entwicklungen des Farbdrucks 1500–1800*, exh. cat., Wolfenbütteler Hefte 29 (Wolfenbüttel: Herzog August Bibliothek;

keeping with the objects themselves. For instance, the leading artist Hans Burgkmair was involved in the 'invention' of colour printmaking (single-sheets, using the paper for highlights) in 1508, but he had designed woodcuts that were issued in up to five colours in the 1490s while he was in Erhard Ratdolt's printshop. Additionally, Ratdolt's colour prints are linked exclusively to book illustrations in the 1480s and 1490s, but his printshop (or a slightly later local printer) may have issued a three-colour single-sheet woodcut as late as the 1510s.¹³ Book illustrations that fit the problematic description of 'true German chiaroscuro' were printed throughout the 1510s by Johannes Schott in Strasbourg; on that basis alone, he can be posited as the printer of Hans Wechtlin's single-sheet colour woodcuts.¹⁴ And Albrecht Altdorfer's six-block colour woodcut of the *Schöne Maria von Regensburg*, c.1519/1520, meets the most common criteria for 'true chiaroscuro' (highlights in the tone block, at least three tone blocks, interdependent tone blocks) but has so few highlights that it has been considered the latest expression of the medieval/book approach.¹⁵ In terms of chronology, style and technique, colour prints fall across a spectrum, not onto two poles. Pictorial elements in books, some with the artistic sophistication associated only with single-sheets, were indeed printed in colour before Ratdolt, between Ratdolt and Goltzius, and long after Goltzius.

The only tracable German book illustration in Strauss' *Chiaroscuro*, the *Arms of Matthäus Lang von Wellenburg, Cardinal and Prince-Archbishop of Salzburg*, 1520, typifies the ramifications of the terminological issues and the disciplinary divide between the history of the book and the

history of art (Fig. 8.1).¹⁶ In studies of the book for which the woodcut was made, the printing of its colour impressions has consistently been overlooked or mis-described as either a hand-painted print with illumination in a single copy or as a two- or four-colour print in up to three copies. However, half of the two dozen surviving impressions are 'normal' woodcuts (from the key block inked in black) and half were printed from seven blocks, making them the most complex colour woodcuts issued in early modern Europe, at least in terms of the numbers of blocks. This discovery has significant implications for the book's reception history, intended usage and potentially imperial patronage.¹⁷ It also makes for a poignant case study about the importance of considering book illustrations as 'art'.

These colour woodcuts generally fall into eight groups: frontispieces (1480s–1530), scientific images (1480s–1520s), printer's devices (1490s–c.1520), illustrations from the Canon missae (from c.1490),¹⁸ decorated initials (from c.1490), title borders and vignettes (from c.1510), almanac illustrations (from c.1550) and broadsides (from c.1550).¹⁹ Excepting some very fine work, mostly by Ratdolt and Schott, they are printed in the same black and red ink as the type (Fig. 8.2). The colour is often used literally to depict red things (blood, fire, lips, clothing, the heraldic tincture of gules). These prints were often either devotional images and/or references to the patron inside the text block until the 1520s; following the development of the title page c.1510, often the only colour-printed image in a book was outside the text block on the title page. The many exceptions tend to fall into clear-cut groups, such as bicolour Zodiacal Men in almanacs whose exposed viscera are printed in red.

Colour-printed woodcuts were produced in books in every corner of the German-speaking lands (and farther afield, often by German printers working abroad) in increasing numbers throughout the sixteenth century and beyond. It has often been noted that most early modern German *artists* who designed colour prints made only two or three, but the sporadic 'development' instead appears

Wiesbaden: Harrassowitz, 2011); A. Stijnman, *Hochzeit von Bild und Buch: Anfänge der Druckgraphik, 1420–1515*, ed. C. Klein-Tebbe, exh. cat., Wolfenbütteler Hefte 26 (Wolfenbüttel: Herzog August Bibliothek; Wiesbaden: Harrassowitz, 2009).

13 E. Giselsbrecht and E. Upper (now Savage) 'Glittering Woodcuts and Moveable Music: Decoding the Elaborate Printing Techniques, Purpose, and Patronage of the *Liber selectarum cantionum*', in *Senfl Studien I*, ed. S. Gasch, B. Lodes and S. Tröster, Wiener Forum für ältere Musikgeschichte 4 (Tutzing: Hans Schneider, 2012), 17–67, esp. 26–27.

14 See A. Klein, 'Hans Wechtlin', this volume, 109.

15 For example, C. Franklin, 'John Baptist Jackson and Chiaroscuro', in *A Catalogue of Early Colour Printing from Chiaroscuro to Aquatint*, ed. C. Franklin and C. Franklin (Home Farm, Culham, Oxford: The authors, 1977), 10. Campbell Dodgson even suggested that 'Ratdolt's workmen kept alive the tradition of this kind of printing', but it was printed decades after Ratdolt handed over his workshop to his son. C. Dodgson, *Catalogue of Early German and Flemish Woodcuts Preserved in the Department of Prints and Drawings in the British Museum*, 2 vols. (London: The Trustees, British Museum, 1903), 1: 37, see also 254.

16 Strauss, *Chiaroscuro*, no. 41. It was most recently discussed in Giselsbrecht and Upper (now Savage), 'Glittering Woodcuts', 17–67.

17 Giselsbrecht and Upper (now Savage), 'Glittering Woodcuts', 18, 44–56.

18 These include the *Kanonblatt* (a full-page image of the Crucifixion with the Virgin and St John facing the 'Te igitur' at the start of the Canon missae) and other prints found consistently within the Canon in printed books, such as the Lamb of God.

19 Restrikes of a number of colour woodcuts from unknown sources were published in facsimile in P. Heitz, *Originaldruck von Formschneide-Arbeiten des XVI. und XVII. Jahrhunderts*, 3 vols. (Strassburg: Heitz, 1890–1899), Tafel I, XVII, LXIX, LXLI, XLV, LXLVI, CXXX, CXXXI, CXXXII, CXXXVII and CLXII.

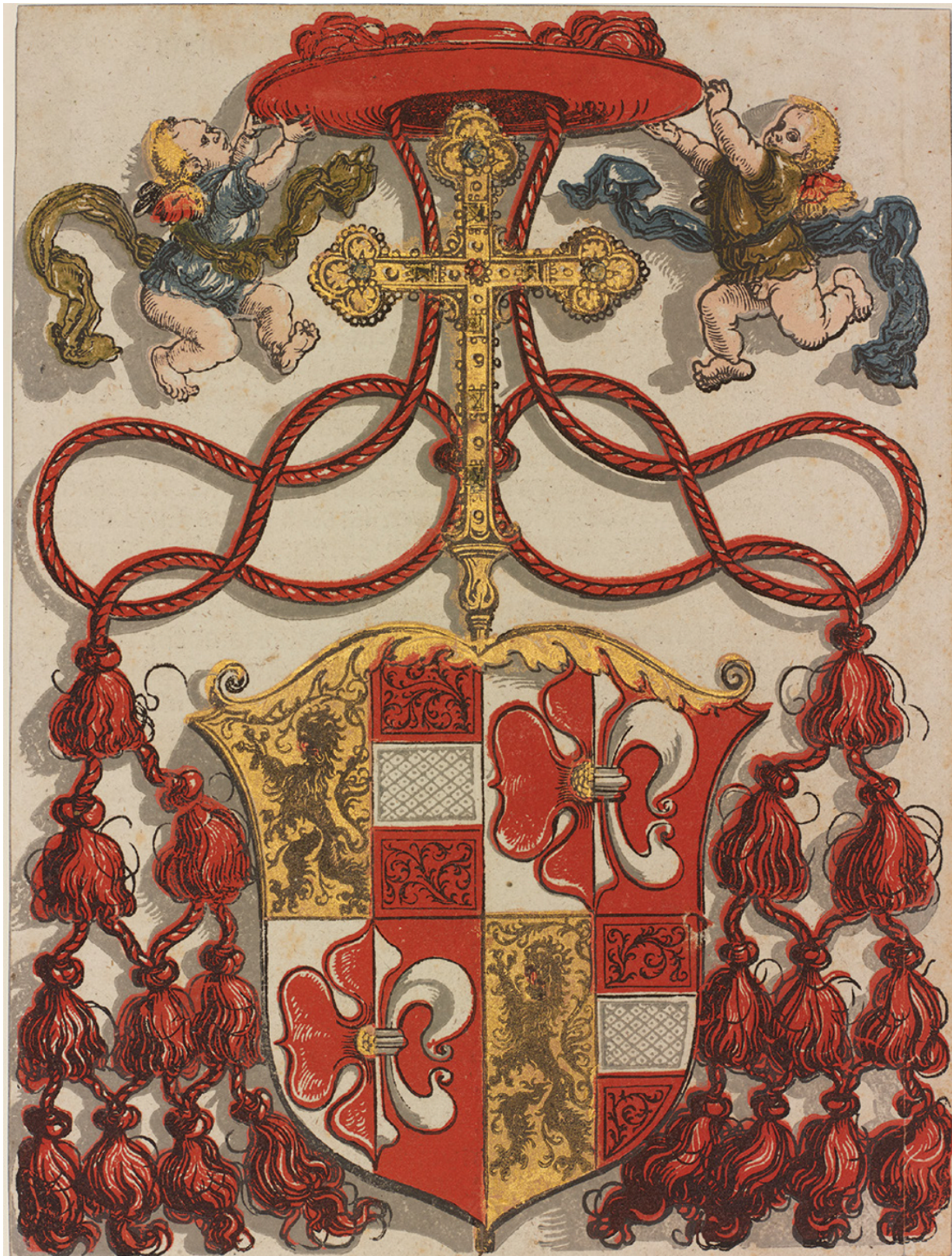


FIGURE 8.1 Arms of Matthäus Lang von Wellenburg as Cardinal-Archbishop of Salzburg, colour woodcut from seven blocks, 12.6 × 8.9 cm. Frontispiece to *Liber selectarum cantionum*, ed. Ludwig Senfl (Augsburg: Sigmund Grimm and Marx Wirsung, 1520)

LONDON, BRITISH MUSEUM, 1862,0208.55. IMAGE PRODUCED BY THE CENTRE FOR HERITAGE IMAGING AND COLLECTION CARE, UNIVERSITY OF MANCHESTER, © THE TRUSTEES OF THE BRITISH MUSEUM



FIGURE 8.2 Anonymous, Picnic with Foxes (*Psalms 14:3*), colour woodcut from two blocks, 7.3 × 8.8 cm.

Title vignette to Jean Bouchet, *Von den losen Füßchen dieser Welt*, trans. Sebastian Brant (Frankfurt am Main: Hermann Gülferrich, 1546)

PRIVATE COLLECTION

continuous when mapped onto the output of *printers*. Printers who issued one tended to issue many, and the style and quality of their colour illustrations may help to refine the attribution to the printer (and possibly designer) of certain single-sheets.

Single-Sheets (1507–c.1572)

Single-sheets are the concern of almost all of the literature. Now they comprise only fifteen percent of the known early

German colour prints by title and survive in hundreds upon hundreds of colour impressions whose extraordinary diversity has not been recognised. Although some attributions remain uncertain, those made between the first and last datable colour prints in the early modern German-speaking lands, 1507–c.1572, fall into three chronological groups.

Firstly, members of Holy Roman Emperor Maximilian I's imperial court and his printmakers led a fertile period of discovery and experimentation from 1507 to c.1520, corresponding roughly to his reign (1508–19). About forty colour woodcuts were made, mainly depicting



FIGURE 8.3 *Hans Baldung Grien, Crucifixion, c.1512-16, colour woodcut from two blocks, 37.1 x 25.8 cm*
AMSTERDAM, RIJKSMUSEUM, RP-P-OB-4113



FIGURE 8.4 *Lucas Cranach, Sermon of John the Baptist, dated 1516 in the key block, colour woodcut from two blocks, 34.1 x 23.9 cm*
AMSTERDAM, RIJKSMUSEUM, RP-P-OB-4477

devotional images, portraits and classical myths. Some, like Hans Burgkmair's three-block *Lovers Surprised by Death*, dated 1510 in the first state (B. VII.215.40), survive in almost three dozen distinct palettes (Klein, Fig. 9.3). Their content and varied palettes may be linked to the thriving print culture in imperial circles in Augsburg and humanist circles in Strasbourg (Fig. 8.3). Generally speaking, complex and innovative work was produced until shortly after the death of Maximilian I in 1519, including imperial portraits with printed gold.²⁰ Then, the rate and quality of production decreased dramati-

cally under the less munificent print patronage of Maximilian's successor, Charles V (reigned 1519–56) and the spread of the Reformation. Many of the fifteen colour woodcuts that seem to have been issued c.1520–c.1560 have uncertain attributions because they involve older, worn key blocks (or copies) to which a tone block was added, sometimes by a later printer (Fig. 8.4). Most are devotional images or moralising allegories of which few colour impressions survive.

Finally, between c.1550 and c.1572, five single-sheets are known to have been designed, three are by Georg Matheus in Augsburg (one is also signed by his daughter Anna) (Fig. 8.5) and two by Tobias Stimmer in Strasbourg. These five are unusual in that they are all signed, reproductive chiaroscuro woodcuts after paintings or sculptures, not original designs or copies of prints in a local style.

All single-sheets are printed in register except the highlight block of one impression from 1508, which is famously

²⁰ Attr. Hans Wechtlin, *Charles V*, hand-coloured woodcut on vellum from two blocks (black and gold), 356 x 203 mm, printed by Jost de Negker, Augsburg, 1519. London, British Museum, inv. 1862,0208.55; digitised at www.britishmuseum.org/research; E. Savage, 'Jost de Negker's Woodcut of *Charles V* (1519): An Undescribed Example Gold Printing', *Art in Print* (July/August 2015), 9–15.



FIGURE 8.5 *Detail of Georg and Anna Matheus, Diana and Acteon Turned into a Stag, c.1550–60, colour woodcut from three blocks, 34.3 × 48.2 cm*
BREMEN, KUNSTHALLE BREMEN, 34204

inked in both gold and silver.²¹ It is rarely recognised that it is a precursor in relief to the approach later known as *à la poupée* printing, which was normally used for intaglio. Many involve an independent key block and a tone block, but the two earliest examples combined a key block and a highlight block. Some had semi-independent key blocks (i.e. all information except for minor details, such as one border of a tablet) and a tone block. Others were composed of interdependent blocks (meaning that every block must be used for the image to be read as complete). The interdependent blocks are assumed to be necessarily tone blocks, but here they provide only lines, only tones (as in Italian chiaroscuro woodcuts), or a mix of both. They can

be identified as having been printed in few towns, namely Wittenberg, Augsburg, Strasbourg, Regensburg and possibly Nuremberg. Like the book illustrations, their styles are richly varied and not necessarily related to chiaroscuro.

In contrast to book illustrations, the extraordinary range of attested palettes seems to include all hues except red, which generally appears only on (possibly much) later impressions.²² When their colour printing is described, they are often grouped by palette, but instead editions tend to be linked by approach to tonal contrast; some multi-block 'states' survive in very different palettes in which, for example, the highlights, mid-tones and shadows are in different colours but the mid-tones are remarkably and consistently dark. The near-total absence of red is difficult to explain, but it may have been a form of product differentiation.

The refinement and expansion of the corpus has revealed much new information, including the identification of general trends in the colours, purposes and stylistic developments of colour printmaking. For instance, the identification of typical palettes, the character of inks and the design of the highlights of sixteenth-century German tone blocks means that some colour prints with sixteenth-century German key blocks (or close copies) can now be dated as from a later century. This information has also enabled the attribution of the design and printing of some unsigned prints, providing new evidence for market demands that challenge widely held beliefs about the early modern print markets.

Finally, the varied colours of inks, the absence of red (which was the dominant colour of colour-printed book illustrations), and the addition of tone blocks following the acquisition of key blocks or copies all point to experiments and innovations in the printshop, not the designer's workshop. Sometimes colour impressions were issued after the blocks had been sold to another publisher, as indicated by the addition of a new printer's address to a block. In other cases new impressions were pulled from the same blocks after the designer's death, as indicated by watermarks. From them, it can be concluded that it was not the *designers*, but the *printers* (or the publishers or the project's financiers) who enabled prints to be issued in colour. They decided whether or not to add colour (to woodcuts known with tone blocks only in late impressions) and controlled the visual effect of the artworks by choosing the colours and tonal contrast of the inks. This practice is better known for later restrikes, such as seventeenth-century reissues of woodcuts by Albrecht Dürer with new tone blocks by the

21 Hans Burgkmair, *St. George on Horseback*, colour woodcut on vellum from two blocks (black and gold/silver), dated 1508. Berlin, Kupferstichkabinett, 3–1924. On *à la poupée* printing, see the A. Stijnman and E. Savage, 'Materials and Techniques', this volume, 13, and E. Savage, 'Colour Printing in Relief', this volume, 27–29.

22 On the problems of early blue printing inks, see Ikeda, 'The Fust and Schöffer Office', this volume, 65–75.

Amsterdam printer and later impressions of woodcuts by Hendrick Goltzius, but it also characterised sixteenth-century production (Fig. 15.4, 15.6).

'Wooden' Panels

The role between printer and designer/artist is blurred also in the case of woodcut intarsia sheets. It is well known that 'normal' perspective woodcuts were attached to wooden items, furniture and wall and ceiling panels. But colour prints were pasted to furniture, domestic objects, and wall and ceiling panels, some of which survive in situ with monochromatic colour block-printed (i.e. stamped) grained papers. Erasmus Loy's colour woodcuts that resemble intarsia designs are included in Strauss' survey, but it has not been realised how widely colour woodcuts were used, and possibly marketed,²³ as a cheaper alternative to intarsia, marquetry and carvings on wooden objects in domestic and ecclesiastical settings in the late sixteenth and seventeenth centuries.²⁴ About forty such designs have now been identified. The standard art historical surveys and catalogues raisonnés tend to include only unused impressions and uncut sheets of decorative strips, usually as single-sheets. Those that remain on wooden objects are perhaps considered secondary to the objects that support them, which fall within the domain of the decorative arts rather than graphic art. They comprise a little understood function of colour printmaking, characterised by a distinct palette, style, subject matter, shape and market. Like the book illustrations and single-sheets, they can be understood only with reference to both their printing techniques and artistic style; Loy described himself as a maker 'maker of decorative and grained paper' (*Fertiger von Kunst- und Flatten-Papier*) in what may be the only contemporary description of printed intarsia panels (not just grained paper). This suggests that he was involved in printing them, not just designing them.²⁵

23 T. Gebhard, *Die volkstümliche Möbelmalerei in Altbayern mit besonderer Berücksichtigung des Tölzer Kistlerhandwerks* (Munich: Callwey, 1937), 19; H. Appuhn, 'Papiertapeten, Riesenholzschnitte und ihre Verwendung im 16. Jahrhunderts', in *Riesenholzschnitte und Papiertapeten der Renaissance*, ed. H. Appuhn, C. von Heusinger (Unterschiedheim: Uhl, 1976), 87.

24 Some are discussed along with (monochromatic) grained paper in F. Kobler, 'Fladerpapier', in *Reallexikon zur Deutsche Kunstgeschichte* (1992) IX, cols. 629–634. Strauss included nine by Erasmus Loy in *Chiaroscuro*, no. 59–63, and another five in 1550–1600, II: 618–633.

25 Transcribed in J. Heller, *Geschichte der Holzschneiderkunst von den ältesten bis auf die neuesten Zeiten* (Bamberg: Carl Friedrich Kunz, 1823), 126.

Artistic Influence

It is generally assumed that these colour prints had little to no influence on artists in the German-speaking lands even in the short term, but they were used directly and indirectly almost immediately, both locally and abroad.

Hans Wechtlin's two-colour *Virgin and Child on a Grassy Bank*, c.1511–13 (B. VII.450.2), travelled along the Rhine from Strasbourg, where it had been printed, and was copied in a stained glass window in the Rhenish valley.²⁶ Shortly afterwards, in 1516, Hans Holbein the Younger may have taken inspiration for the composition and architectural background of part of his first major painting commission, a portrait of Dorothea Kannengiesser from 1516, from Hans Burgkmair's three-colour woodcut of the portrait of *Hans Paumgartner*, 1512 (B. VII.212.34).²⁷ A three-colour woodcut of the Quaternion Eagle (a double-headed imperial eagle whose wings each bear four groups of imperial states), which is a close copy of a woodcut designed in 1510 by Burgkmair, was printed in Augsburg by Jost de Negker before his death in 1544.²⁸ It, or another copy, was used as the model for a *Reichsadlerhumpen* ('eagle glass', a cylindrical beaker with the Imperial Eagle) made in Bohemia (now the Czech Republic) in 1574.²⁹ There are many other examples of the rapid re-use of colour-printed material in other media, and the reception history of early colour printing must acknowledge the influence of these German colour woodcuts on (relatively) local artistic producers.

26 Musée national du Moyen Age, Paris, 14146. S. Lagabrielle, 'L'or des fenêtres (XVe–XVIIe siècles)', *1 Mois 1 Oeuvre* (January 2002), 2. I would like to thank Alice Klein for bringing this to my attention.

27 Hans Holbein the Younger, *Jakob Meyer zum Hasen and Dorothea Kannengiesser*, 1516, oil on limewood, each panel 396 × 310 mm. Basel, Kunstmuseum, 312.

28 The unique impression of the colour woodcut: Anonymous copy, possibly after another anonymous copy (Nuremberg?), after Hans Burgkmair, *Das Hailig Römisch reich mit sampt seinen gelidern*, colour woodcut from three blocks with additional hand-painting, printed in Augsburg by Jost de Negker before 1544. Boston, Museum of Fine Arts, AL. 1203.

29 Anonymous (Bohemia), *Reichsadlerhumpen*, 1574, glass beaker with enamel, 1574, 318 mm × 114–33 mm in diameter. Los Angeles County Museum of Art, William Randolph Hearst Collection (48.24.229). Several key block-only impressions of the print and its copies were hand-painted in the same heraldic tinctures as the unique surviving colour impression, and the design and colouration may equally follow a hand-painted impression. The colouration is strikingly similar to the painting in an impression of another copy of the woodcut that was published by Jost de Negker's son David presumably while he was active in Vienna 1576–85, c.285 × 400 mm; see http://en.wikipedia.org/wiki/File:Quaterionenadler_David_de_Negker.jpg (accessed 15 November 2013).



FIGURE 8.6A Hans Baldung (Grien), Preparation for the Witches' Sabbath, dated 1510 in the key block, colour woodcut from two blocks, 38.9 × 27 cm

NEW YORK, METROPOLITAN MUSEUM OF ART, GIFT OF FELIX M. WARBURG AND HIS FAMILY, 1941, 41.1.201



FIGURE 8.6B Lucantonio degli Uberti, reverse copy of Hans Baldung Grien, Preparation for the Witches' Sabbath (1510), dated 1516 in the key block, colour woodcut from two blocks, 37.5 × 25.7 cm.

LONDON, BRITISH MUSEUM, 1852,0612.105. PHOTO PRODUCED BY THE CENTRE FOR HERITAGE IMAGING AND COLLECTION CARE, UNIVERSITY OF MANCHESTER, © THE TRUSTEES OF THE BRITISH MUSEUM

But some were also influential abroad. It is often assumed that the German artists followed developments in Italy, but some Italian artists and printers quickly imitated German examples. Tone blocks that Ratdolt left in Venice when he returned to Augsburg in 1487 were reused by Venetian printers,³⁰ but some illustrations in Italian incunabula were also printed in two or three colours in the manner he pioneered (e.g. Fig. 2.7, p. 32).³¹ Ratdolt not only left his blocks, but also the concept of multi-colour printing and the technical know-how to produce colour printing inks and printing in register. Later, the design of Burgkmair's three-colour woodcut *Lovers Surprised by Death* (dated 1510 in the first state) was copied on a majolica dish of c.1525 attributed to Nicola di Gabriele Sbraga (Nicola da Urbino).³² Its palette may also derive from the model; the blue-green colours are close to those in an impression of a later edition of the print issued by Jost de Negker, possibly c.1518 (Klein, Fig. 9.3, p. 106). But most significantly, the artist Lucantonio degli Uberti designed a reverse copy of Hans Baldung's two-colour *Preparation for the Witches' Sabbath* (dated 1510 in the key block; B. VII.319.55; Fig. 8.6) and dated it 1516 in the block.³³ Lucantonio was active in Venice from c.1503 to c.1550; the Senate of Venice granted Ugo da Carpi a privilege for his invention of woodcuts that imitate chiaroscuro drawings on 25 July 1516 (Introduction, Fig. 1, p. 6).³⁴ This means that a copy of a German woodcut was either the first multi-colour single-sheet print produced in Italy or a very close second.

These artworks continued to be used by artists from other areas long after they were made. For instance, Walter Strauss noted that the Netherlandish artist Hans Vredeman

de Vries (who was also active in Germany) designed and possibly printed a three-block woodcut architectural perspective that is very much in the style of Erasmus Loy in the late sixteenth or early seventeenth century,³⁵ and Peter Paul Rubens made a pen drawing after the key block of Burgkmair's *St George on Horseback* (1508) in his *Costume Book* in 1609–12.³⁶

The few examples are sufficient to indicate that the influence of colour woodcuts, especially the more sophisticated single-sheets and market-friendly intarsia sheets, lasted far longer and reached much farther afield than has been realised. The early reception history and artistic influence of early modern German colour printmaking remains to be studied, but single-sheet colour woodcuts were used as models, both directly and (possibly) indirectly, in the German-speaking lands and abroad, immediately and long after they were produced.

Conclusions

The variously defined 'invention' and 'progress' of colour printmaking takes a very different shape than has been thought. Rather than being short-lived and expressed in simplistic medieval book illustrations in the 1480s and 1490s and then complex single-sheets mainly in the 1510s, the phenomenon spread quickly across all of the German-speaking lands (and beyond). It appealed to different kinds of consumers in three specific markets, and thrived for decades in books, single-sheet prints and the decorative arts. Their pigments can be confirmed only after scientific examination has been carried out, but distinct palettes can be observed in each of these categories. Colour-printing techniques did not develop along a clear trajectory or according to *artists'* ambitions; instead, these many colour woodcuts attest *printers'* creativity in working with available tools to complete specific jobs for specific markets. It did not develop in isolated workshops, and the approach sometimes called 'German chiaroscuro' is also found outside the German-speaking lands. Colour woodcuts were produced and copied in other media across a large area for diverse purposes over the decades, suggesting a previously unrecognised demand for printed colour in early modern print, book and visual cultures.

30 Stijnman, *Hochzeit*, 26, fig. 11; Grimm, Kleine-Tebbe and Stijnman, *Lichtspiel*, 70, fig. 20.

31 For example, the generic family tree, colour woodcut in three colours (black, red and brown), with green painting in Johannes Crispus de Montibus, *Repetitio Institutionum titulorum de hereditibus et de gradibus* (Venice: Johannes Hamman, 19 Oct. 1490), Munich, Bayerische Staatsbibliothek, 2 Inc.c.a. 3475#Beibd.2, fol. 190^v–91^r.

32 Paris, Louvre, OA7577; image available at <http://cartelen.louvre.fr> (accessed 15 November 2013).

33 Attr. Lucantonio degli Uberti, reverse copy after Hans Burgkmair, *Preparation for the Witches' Sabbath*, dated 1516, colour woodcut in two blocks (black and orange), 375 × 257 mm. London, British Museum, 1852.0612.105; see E. Savage, 'Inventing Chiaroscuro: Lucantonio degli Uberti's Copy of Hans Baldung, *Preparation for the Witches' Sabbath*, 1516' (in progress). The orange is similar to what may be the only contemporary impression in orange of the model (Paris, Bibliothèque nationale de Paris, EcN1388a).

34 On Ugo's petition for a privilege and claim of invention, see N. Takahatake, 'Ugo da Carpi's *Diogenes*', this volume, 116.

35 Strauss, *Chiaroscuro*, no. 114.

36 Peter Paul Rubens, *Knight on Horseback and Other Studies*, pen and ink, from the *Costume Book*, 1609–12, up to 336 × 232 mm; Corpus Rubenianum xxiv 22. London, British Museum, 1841.1211.8.21.

Hans Wechtlin and the Production of German Colour Woodcuts¹

Alice Klein

In the eighteenth century, the prolific German scholar and art historian Christoph Gottlieb von Murr held Hans Wechtlin, a painter active in Strasbourg between 1506 and 1519, as the inventor of the so-called ‘chiaroscuro’ printmaking technique.² Wechtlin was obviously the most prolific colour printmaker in the first two decades of the sixteenth century as, of the thirty or so colour woodcuts printed on single sheets in Germany, twelve belong to his corpus.³ In the first half of the twentieth century, Heinrich Röttinger, the main authority on Wechtlin at the time, upheld von Murr’s theory but also suggested that Wechtlin had perfected the ‘chiaroscuro’ woodcut technique around 1505 and passed it onto Lucas Cranach in 1506 during a visit to Wittenberg.⁴ This would have made Wechtlin the pioneer of ‘fine art’ colour printmaking; Cranach printed the celebrated ‘first’, the *St George and the Dragon* from a key block in black and a highlight block (not a tone block) in gold on blue prepared paper, in Wittenberg in 1507, to which the Augsburg artist Hans Burkgmair responded in 1508 by producing woodcuts of *Maximilian I on Horseback* and *St George on Horseback* in nearly the same technique. Later that year, they were issued in their second state with the highlights cut out from a tone block.⁵

Röttinger’s assumption has been unanimously dismissed.⁶ By now, it has been accepted that single-sheet woodcuts were first printed with tone blocks in 1508, neither in Strasbourg nor in Wittenberg, but in Augsburg,⁷ and that book illustrations were printed with tone blocks in Augsburg from the 1480s.⁸ Furthermore, as early as 1923, Karl Theodore Parker, future Keeper of the Ashmolean Museum, Oxford, underlined the significance of Paul Kristeller’s discovery of a copy of the frame of Wechtlin’s colour woodcut *Skull Within an Ornamental Frame*, in a book printed by Jacob Köbell in 1513;⁹ the model, Wechtlin’s woodcut, must have been printed before 1513. In this light and since he could find no obvious difference in style between Wechtlin’s few accurately dated colour woodcuts and the ‘normal’ woodcuts he made between 1506 and 1508, Parker dated all the colour woodcuts signed with his monogram I°V between 1510 and 1512.¹⁰

Even if Parker’s dating can be accepted, it must be clarified. Research has not advanced significantly; this paper is

1 Translated from French into English by Marie Canard.

2 This term is frequently used to refer to all colour woodcuts that are designed to give a three-dimensional effect, but it is not used in this text because it was not the contemporary term. Both its first recorded use in archival sources in 1516 (after the *terminus ante quem* of the prints discussed in this chapter) and its first printed use in 1550 were in Italian texts that referred to the imitation of Italian chiaroscuro drawing. As no generic term seems to have been used in German for centuries, ‘colour woodcut’ is used in this book. For details, see E. Savage, ‘Colour Printing in Relief’, this volume, 23–24.

3 C.G. von Murr, *Journal zur Kunstgeschichte und zur allgemeinen Litteratur*, 2. Teil (Nuremberg: Eberhard, 1776), 147. The twelve, of which all but one of which are signed with his monogram I°V, are reproduced in W.L. Strauss, *Clair-Obscur: Der Farbholzschnitt in Deutschland und den Niederlanden im 16. und 17. Jahrhundert* (Nuremberg: Carl, 1973), nos. 19–30.

4 H. Röttinger, ‘Hans Wechtlin und der Helldunkelschnitt’, *Gutenberg-Jahrbuch* (1942–43), 107–13. Röttinger was convinced that Wechtlin’s first chiaroscuro woodcut print was *Pyramus and Thisbe*, and that it had been printed before 1505, when Marcantonio Raimondi made a print that (Röttinger claimed) was after it.

5 See A. Grebe, ‘Dürer in Chiaroscuro’, this volume, 171–73.

6 Several art historians demonstrated that, on the contrary, Wechtlin’s image was after Marcantonio or that they were after a common model. See P. Kristeller, ‘Carpi, Ugo da’, in U. Thieme and F. Becker, *Allgemeines Lexikon der Bildenden Künstler von der Antike bis zur Gegenwart*, 37 vols. (Leipzig: Seemann, 1907–62), 6: 48; A. Oberheide, *Der Einfluss Marcantonio Raimondis auf die nordische Kunst des 16. Jahrhunderts* (Hamburg: Schimkus, 1933), 136. See also G. Bartrum, ed., *German Renaissance Prints, 1490–1550*, exh. cat. (London: British Museum Press, 1995), 66.

7 On an earlier approach to colour printmaking, see A. Stijnman and E. Savage (formerly Upper), ‘Color Prints before Erhard Ratdolt: Engraved Paper Instruments in Lazarus Beham’s *Buch von der Astronomie* (Cologne: Nicolaus Götz, c.1476)’, *Gutenberg Jahrbuch* (2014), 86–105. On the ‘invention’ in 1508 or 1510, see E. Savage, ‘Colour Printing in Relief’, this volume, 27–28; A. Grebe, ‘Dürer in Chiaroscuro’, this volume, 171–73.

8 D. Landau and P. Parshall, *The Renaissance Print, 1470–1550* (New Haven, London: Yale University Press, 1994), 197–98.

9 K.T. Parker, ‘Quelques dessins de l’école alsacienne du xve et du xvie siècle’, *Archives alsaciennes d’histoire de l’art*, 2me Année (1923), 74. The copy of the frame is the frontispiece to J. Stöffler, *Elucidatio Fabricae Ususque Astrolabii* (Oppenheim: Köbel, dated 1512 in the colophon and 1513 in the title border), VD16 S 9191. Parker accepted the year 1512, but today most library catalogues use 1513.

10 More specifically, but without justifying it, Parker put forward the date of 1510 for the colour woodcuts *Christ on the Cross* and *St Jerome*.

the first published study that is based on a complete survey of Wechtlin's known colour woodcuts (Table 9.1 and Table 9.2).¹¹ It reveals that some survive in several palettes and states (combinations of blocks) that were printed at different times, and a close look at these copies provides new information not only about their production, but also about how this new printmaking technique was passed from Augsburg to Strasbourg and thus the chronology of the invention and dissemination of early colour printmaking. The thorough study of all stylistic and distinctive technical features in Wechtlin's woodcuts forces the reconsideration of a hypothesis that has regularly resurfaced in (brief) texts since the 1980s, i.e. that Wechtlin learnt the technique from its first producers in Augsburg in 1508.¹²

Dating Wechtlin's Colour Prints

The limited literature on Wechtlin's colour woodcuts largely consists of speculation about its dates of production. New research allows us to date them with more certainty, however, and explains aspects of their original (and subsequent) production that have puzzled scholars.

¹¹ It is derived from unpublished research in A. Klein, 'Hans Wechtlin, peintre à Strasbourg à la veille de la Réforme' (Hans Wechtlin, Painter in Strasbourg at the Dawn of the Reformation) (PhD diss., University of Paris IV-Sorbonne, 2014), which is the first modern assessment of all of Wechtlin's artistic production.

¹² O. Pannewitz, *Die Renaissance im deutschen Südwesten: zwischen Reformation und Dreissigjährigem Krieg*, exh. cat. (Karlsruhe: Badisches Landesmuseum, 1986), notice F27, p. 393, and C. Kemmer, *Von Cranach bis Baselitz: Meisterwerke des Clairobisur-Holzschnitts*, exh. cat. (Braunschweig: Herzog Anton Ulrich-Museum, 2003), 21. Both Pannewitz and Kemmer suggest that Wechtlin had learnt the chiaroscuro woodcut technique from blockcutter Jost de Negker. But it should not be overlooked that nothing proves that De Negker was already in Augsburg in 1508. Hans Burgkmair's prints only mention his name from 1511 onwards and it only appears in the town records from 1512 onwards. The many theories of De Negker's involvement in Burgkmair's 'inventions' in both 1508 and 1510 are discussed at length (and dismissed) in E. Savage (formerly Upper), 'Printing Colour' in the Age of Dürer: German 'Chiaroscuro' Woodcuts, 1487–ca.1600', 3 vols. (PhD diss., University of Cambridge, 2012) 1: 60–80. It is also possible that other blockcutters elaborated the colour woodcut technique with Burgkmair, among whom Wolfgang Resch, who lived at the painter's house in 1508, and Cornelius Lieftrink, who cut the block for *The King of Cochin* that same year. On blockcutters cooperating with Burgkmair, see R. Kroll, 'Druckstöcke zu den Holzschnitten', in *Hans Burgkmair, 1473–1531: Holzschnitte, Zeichnungen, Holzstöcke, Berlin, Kupferstichkabinett und Sammlung der Zeichnungen* (Berlin: Staatliche Museen, 1974), 38.

A new *terminus ante quem* can be given to one of Wechtlin's colour woodcuts, and to possibly two others. A copy of *Virgin and Child in a Frame* appears in a book printed in Lyon by Johann Clein in July 1511.¹³ Wechtlin's woodcut must have been on the market no later than the beginning of 1511 and thus made beforehand. This *terminus ante quem* could also be relevant for the first state (i.e., from two blocks) of *St Sebastian* and *The Crucifixion* because many similarities between the three indicate that they were conceived of and elaborated as a series:¹⁴ they are all illustrations of religious subject-matters, framed with the same ornamental strips in the same dimensions.

Two others must have also belonged to that series: *St Jerome in the Desert* and *St Christopher* survive only in three-block impressions, like the second state of *Virgin and Child in a Frame* (Fig. 9.1), *St Sebastian* and *The Crucifixion*. In this state of all five prints, the central scenes are no longer framed with ornamental strips, the prints are the same dimensions, and the third block, which is printed in the darkest ink, serves the same secondary purpose of adding insignificant visual information (such as the leafless branches right of the holy martyr in *St Sebastian*) and primary purpose of bringing details into relief. For example, in the trees of the landscape in the background of *St Jerome*, the new black lines are only superimposed on the conifer outlines already provided in dark grey by the first block. Hence, one can assume that the third block was added to make up for the worn first block. Thus, there were probably a first state of *St Jerome in the Desert* and *St Christopher*, framed in the same ornamental strips as *Virgin and Child in a Frame*, *St Sebastian* and *The Crucifixion* and also printed from two blocks around 1510 (Table 9.1), and the second states of these five colour woodcuts were thus certainly printed (long) after 1510.

As to the seven other colour woodcuts signed with the monogram I°V, Parker rightly emphasised their stylistic similarities. Moreover, those with classical iconography (*Pyramus and Thisbe*, *Orpheus* and *Alcon Slaying the Serpent*, Fig. 9.2) have the same dimensions as *Virgin and Child on a Grassy Bank* and those with secular iconography (*Knight and Halberdier*, *Skull Within an Ornamental Frame*). On the basis of stylistic analysis and their similar format, I suggest that they were created between 1510 – most likely to be the year for the first-state impressions of the five other colour woodcuts – and 1513 – the year a copy of the frame of *Skull*

¹³ Frontispiece to *Hortulus Animae* (Lyon: Clein, 1511). See: M.C. Oldenbourg, *Hortulus animae [1494]–1523: Bibliographie und Illustration* (Hamburg: Hauswedell, 1973), 100–02.

¹⁴ On the issuing of colour woodcuts in editions in sixteenth-century Italy, see L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 123–39.



FIGURE 9.1 *Hans Wechtlin, Virgin and Child in a Frame, after 1510 (1520?), woodcut from three blocks, 18.9 x 12.6 cm*
PARIS, BIBLIOTHÈQUE NATIONALE DE FRANCE



FIGURE 9.2 *Hans Wechtlin, Alcon Slaying the Serpent, c.1510–13, woodcut from two blocks, 27.0 x 18.2 cm*
PARIS, BIBLIOTHÈQUE NATIONALE DE FRANCE

Within an Ornamental Frame appears in a book printed by Jacob Köbell (Table 9.2).

The colours of the first-state impressions can be difficult to define because the pigments were not necessarily finely ground, the inks were not evenly mixed and a blue (presumably indigo) is particularly susceptible to fading.¹⁵ However, at least two palettes can be discerned in the first state (from two blocks) in all of Wechtlin's colour woodcuts: black and blue, and black and green. The sharpest impressions are those with a distinctly brighter blue, which may form another group or which may simply indicate which blue impressions were better protected from sunlight over the centuries. This may suggest that they were not only printed as series, but also that the series were printed in several editions, over time, with different palettes.¹⁶

15 On the difficulties of blue printing ink, see M. Ikeda, 'The Fust and Schöffer Office', this volume, 73–75.

16 It is difficult to discern whether the green or blue palette was printed first because there is little physical damage to the key

Wechtlin's and Burgkmair's Colour Woodcuts

Wechtlin's distinctive light blue may have another significance because, in all colour woodcuts known from early modern Germany,¹⁷ it was used only in impressions of three-block woodcuts by Hans Burgkmair, later states of *Lovers Surprised by Death* (dated 1510 in a block, Fig. 9.3) and *Johannes Paumgartner* (dated 1512 in a block).¹⁸ This

blocks that may indicate the order of production. For instance, the left top border of the *St Sebastian* (London, British Museum, 1857,0613.344) is less sharp on the green print than on the blue print (Paris, Bibliothèque Nationale de France, Ea 18c rés., pet. fol. EcN 1406), but that may indicate that the woodblock was not evenly inked rather than that the block was worn.

17 At least, in the almost 400 identified in E. Savage (formerly Upper), *Printing Colour*, esp. vols. 2 and 3 (catalogues of colour woodcuts).

18 H-G 5: 124, no. 724 and H-G 5: 101, no. 307.



FIGURE 9.3 Hans Burgkmair, *Lovers Surprised by Death*, dated 1510, woodcut from three blocks, 21.0 × 15.0 cm
PARIS, BIBLIOTHÈQUE NATIONALE DE FRANCE

similarity in the production of their works is all the more interesting since, as Max Geisberg pointed out, Wechtlin's complex colour woodcuts are conceptually closer to Burgkmair's than to those with a simpler design and darker palettes issued around the same time by his fellow citizen of Strasbourg, Hans Baldung.¹⁹

In Burgkmair's first two colour woodcuts, *St George and the Dragon* and *Emperor Maximilian I on Horseback*, the printed colour was not essential to the image's design and the key block could be printed alone.²⁰ The same holds for

those made by Cranach in Wittenberg 1508–09 and, with the exception of only minor details (e.g., the lower edge of a tablet), Baldung in Strasbourg c.1510–14.²¹ Their key block-only impressions lose some expressiveness and details, like tree bark, but none of their legibility. However, Wechtlin's colour woodcuts survive only in multi-block impressions even though they range from having an independent key block (e.g., *Orpheus*) to having fully interdependent blocks.²² Of course, it is impossible to know what has been lost, but this may suggest that Wechtlin intended to create woodcuts in which the printed colour was essential.

In 1510, Burgkmair elaborated a third colour print, but this time with the use of three blocks: *Lovers Surprised by Death* (Fig. 9.3). All blocks must be used, like a modern screenprint, and, in that respect, it can be compared to some of Wechtlin's made with two blocks such as *Alcon Slaying the Serpent* (Fig. 9.2). The way the female lover's hair flies in front of her and stands out against the dark background as she flees Death is reminiscent of the stylistic effect used by Wechtlin to draw the face of Alcon's son: in both cases, there are no outlines and colour communicates the image. Both artists brought the technique to a more sophisticated level at roughly the same time, Burgkmair in 1510 and Wechtlin c.1510.

Likewise, when they both use two blocks, one can notice that the key block sometimes contributes to the shading (not the outline) of the image by adding areas of black instead of hatching. For instance, in Wechtlin's *Virgin and Child in a Frame* and Burgkmair's *Pope Julius II* (1512),²³ the grotesques or arabesques and the date stand out against the black background and are coloured by the second block. This taste for ornaments and Italian architectural designs is another similarity between Wechtlin's

19 M. Geisberg, *Der Buchholzschnitt im 16. Jahrhundert in deutschen, schweizer, niederländischen, französischen, spanischen und italienischen Drucken des 16. Jahrhunderts* (Berlin: Schloss, 1937), 16.

20 There are three recorded exemplars of a key block-only print of *Maximilian I* (H-G 5: 108, no. 323) and six of *St George* (H-G 5: 74, no. 253). Many more are identified in Savage (formerly Upper), 'Printing Colour', 3: 543–45 (*Maximilian I*) and 532–33 (*St George*).

21 Several key block-only exemplars of each of Lucas Cranach's colour woodcuts survive: *St George and the Dragon* (H-G 6: 58, no. 81); *St Christopher* (H-G 6: 56, no. 79); *Venus and Cupid* (H-G 6: 81, no. 105); *Rest on the Flight into Egypt* (H-G 6: 17, no. 7). And so have been Baldung's five colour woodcuts: *Preparation for the Witches' Sabbath* (H-G 2: 136, no. 235); *St Jerome* (H-G 2: 110, no. 120); *Virgin and Child with Eight Angels in a Landscape* (H-G 2: 97, no. 62); *The Fall of Man* (H-G 2: 76, no. 3); *Christ on the Cross* (H-G 2: 81, no. 11). Further key block-only impressions are identified in Savage (formerly Upper), 'Printing Colour', vol. 3, Baldung (513–30) and 564–80 (Cranach).

22 It is however worth noting that the block *Skull Within an Ornamental Frame* was used several decades after 1510. The skull, without its frame, was indeed printed on fol. 4^v of L. Samosatensis, *Spiegel der Menschlichen blödikeyt* (Strasbourg: Cammerlander, 1545), VD16 L 3062.

23 H-G 5: 106, no. 316b.

and Burgkmair's colour woodcuts; the latter is regarded as the first German painter to use Renaissance shapes in his work.²⁴

In brief, the similar technique in some of Burgkmair's and of Wechtlin's colour woodcuts challenges a landmark in the history of colour printmaking: Burgkmair's *Lovers* (1510), is thought to be the first print to which the colour printing is essential to the legibility of the image and for which all blocks are fully interdependent and is thus celebrated as a conceptual breakthrough, a precursor to Italian chiaroscuro woodcut printmaking, in the sense of 'true chiaroscuro' from interdependent tone blocks but without a key block, or with colours but without an outline. But Wechtlin was achieving the same effects at the same time. Secondly, Wechtlin drew architectural patterns and scenes in an Italian Renaissance style c.1510, about a year after Burgkmair introduced them in the German-speaking lands. From these few parallels can it be concluded that Hans Wechtlin stayed in Augsburg in 1508?

The Transmission of a New Technology: Refuting Wechtlin's Stay in Augsburg

Considering whether Hans Wechtlin learnt the chiaroscuro technique in Augsburg, one must also ponder his motives: Did Hans Wechtlin go to Augsburg only because he was interested in the printing technique or was he already working in the area at the time?

Between 1507 and 1513, he was not yet a burgher of Strasbourg (or of any other city in the Holy Roman Empire) and could therefore not run his own workshop.²⁵ He was then probably working as an experienced journeyman painter, just like Hans Schäufelin was. The latter, who may have been hired by Hans Holbein the Elder, made several paintings in Augsburg and was commissioned to design church windows and produce illustrations there between 1509 and 1513.²⁶ But on the contrary there is no

evidence that Wechtlin was in Augsburg or even in Swabia at this time.²⁷

Similarly, Wechtlin's interest in Renaissance ornaments and architecture in 1510 is not sufficient evidence that he went to Augsburg. Some of Wechtlin's woodcuts from 1506–08 include Italianate features. He probably encountered this style from French painters in the court of René II, Duke of Lorraine, where he was court painter for a year from 1 May 1506.²⁸ Furthermore, the distinctive motives of which his grotesques are invariably composed, such as bat wings, animals skulls and phytomorphic human faces, are nowhere to be found in Burgkmair's work. The mouldings of his entablatures are also more lavishly decorated than Burgkmair's, and the foliage and other plant and flower patterns are much less delicate than those in Burgkmair's woodcuts. To all appearances, Wechtlin followed a different set of models, or even made his own. He may have compiled them in 1506–07 as he stayed in Lorraine or, like Urs Graf in 1512–13, he may have drawn his inspiration from title frames found in Italian books.²⁹

If there is no reason to think that Hans Wechtlin worked for months in Augsburg, can it nevertheless be maintained that he made a short trip there to learn the chiaroscuro printing technique? The theory is problematic on several accounts. First of all, it raises a tricky question: why would the craftsmen printing in colour in 1508 open the doors of their workshop to Wechtlin? It is not hard to imagine that the people who developed the technique were unwilling to share their know-how so easily. If one maintains that Wechtlin learnt the colour printing technique in Augsburg, one must also maintain that he had strong connections

24 C. Baer, *Die italienischen Bau- und Ornamentformen in der augsburger Kunst zu Beginn des 16. Jahrhundert* (Frankfurt am Main: Lang, 1993), 383ff.

25 In 1514, Wechtlin inherited the status of burgher of Strasbourg from his father. This status was compulsory for any master willing to establish a workshop in the Alsatian city. About the records mentioning Wechtlin, see H. Rott, *Quellen und Forschungen zur südwestdeutschen und schweizerischen Kunstgeschichte im xv. und xvi. Jahrhundert, iii: der Oberrhein. Quellen I (Baden, Pfalz, Elsass)* (Stuttgart: Strecker und Schröder, 1936), 219–24.

26 C. Metzger, *Hans Schäufelin als Maler* (Berlin: Deutscher Verlag für Kunstwissenschaft, 2002), 43–47.

27 About references to painters, masters and journeymen in Augsburg at that time, see J. Wilhelm, *Augsburger Wandmalerei 1368–1530: Künstler, Handwerker und Zunft* (Munich: Muhlberger, 1983). Moreover, after a thorough study of illustrations in books printed in Augsburg as well as of the paintings and church windows made in Augsburg or its surroundings in the first decade of the sixteenth century, none betrays characteristics of Wechtlin's distinctive style.

28 H. Lepage, *Quelques notes sur des peintres lorrains des xve, xvie et xviiie siècles* (Nancy: Lepage, 1853), 14.

29 The woodcuts which Wechtlin allegedly copied have never been found. A few grotesques and architectural designs composing the framing of Italian titles look very much like Wechtlin's but it proves by no means that he was inspired by them. See for instance the frontispieces to *Aesopus moralisatus* (Verona: Giovanni and Alberto Alvise, 1479), GW 00428, ISTC ia00148000, and Marcus Tullius Cicero, *Illustria monimenta* (Venice: Soardus, 1508), Edit 16 12168. It is also noteworthy that parallels with Wechtlin's woodcuts could neither be established when referring to illustrations in books printed in France in the first decade of the sixteenth century.

with artists and printers in Augsburg, but, as it was earlier underlined, no evidence links him to any Augsburg workshop, artist or printer. More problematically, these theories have never acknowledged that Wechtlin was a *painter*, not an *engraver* or a *printmaker*.

The scenario beggars belief: this painter would have undertaken a brief trip to a new city for which there are no records; he would have learned a new, cutting-edge method of printmaking, using materials and techniques that he did not know how to use; one of the greatest printmakers of his generation, to whom he is not linked, would have shared his precious knowledge and model book with him; he would have immediately mastered the skills of designing, blockcutting, mixing colour printing inks, and printing these special woodcuts; and then he would have suddenly set up shop in Strasbourg. Wechtlin's use of Italianate ornament does not suggest that he was familiar with Burgkmair's work, and the only 'evidence' for this trip is the fact that he produced colour woodcuts. The argument is circular and cannot be accepted.

Wechtlin's Role(s) and the Process of Dissemination

Traditional lines of enquiry about Wechtlin's artistic development and the geographical dissemination of colour printmaking in fine art are predicated on the assumption that he cut his blocks himself, but there is no indication that he did so. On the contrary, the fact that his woodcuts from 1508–17 are characterised by so many very different styles suggests that his role may have been more typical: a designer, not both a designer and block cutter.³⁰ In all likelihood, like so many woodcut designers of his time, he only provided the drawing and left the blockcutting to the blockcutter and the printing to the printer.³¹

Thus, others could have been responsible for handing down the know-how of the technique from Augsburg to Strasbourg. A woodcutter may have imported it to Strasbourg. Craftsmen regularly travelled between both towns; for instance, in late 1510, a blockcutter from Strasbourg was brought to Augsburg to cut the woodcuts for Maximilian I's genealogy.³² Moreover, a Strasbourg printer may have seen Burgkmair's and Cranach's colour woodcuts and attempted to make similar prints. It is almost certain that Wechtlin came across Burgkmair's woodcut *St George* (he used it as a model for his *Knight and Halberdier*). If he did see a colour impression, one can wonder if close observation could have been enough to understand how it was made and hence to produce similar prints in Strasbourg.

At the current state of research, the blockcutter(s) who may have cut Wechtlin's and Baldung's colour woodcuts in Strasbourg cannot be identified. It is, however, possible to identify their printer. Until 1513, Johann Schott was the only Strasbourg printer to include colour woodcuts in his books, and none of his competitors in the later 1510s were able to match the sophistication and complexity of the colour prints he issued. The inks he used are moreover quite close to those used in Baldung's and Wechtlin's colour woodcuts.³³

The centrality of *printers*, not *painters*, to the dissemination of this technique could explain at least why the later (three-block) state of Wechtlin's colour woodcuts is of a lower standard than the earlier (two-block) state. The addition of new elements can throw the picture off-balance; it is hard to recognize Wechtlin's style when looking at the tree added beside the Virgin and the reworking of St John's eyes in *The Crucifixion*. But this makes sense if, on Schott's request, a blockcutter added them in a new block to mask the damage to a worn woodblock. This is

30 Between 1506 and 1508, Wechtlin made, among others, a series of forty-three woodcuts illustrating the life of Christ for several books printed in Strasbourg between 1506 and 1541. See M.C. Oldenbourg, 'Die Holzschnitte des Urs Graf zur Passion und die des Johann Wechtlin zum Leben Jesu', in *Festschrift für Joseph Benzing zum 60. Geburtstag*, ed. E. Geck and G. Pressler (Wiesbaden: Pressler, 1964), 291–310. His last known pieces of work, further quoted in many records from Strasbourg until 1517, are the illustrations of H. von Gersdorff, *Feldtbuch der Wundtartzney* (Strasbourg: Schott, 1517), VD16, G 1618.

31 The work of woodcutters in Strasbourg (though not very well documented) as well as the roles played by painters and printers in the making of single sheet and illustration woodcuts are lengthily depicted in Klein, 'Hans Wechtlin', 27–54, 165, 242–245.

32 T. Herberger, *Conrad Peutinger in seinem Verhältnisse zum Kaiser Maximilian I.* (Augsburg: Butsch, 1851), 30. Conrad Peutinger's letter to Emperor Maximilian I, 17 November 1510, is transcribed in footnote 94.

33 It should be added that observations with the naked eye do not allow a thorough study of the colours and little is known about how colour printing inks change over time; see L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 123–39 and B. Price *et al.*, 'A Technical Study', this volume, 140–50. All visual analysis in this paper should be considered with some reserve. It is also worth noting that Hans Wolff pointed out that a book with a blue title border was printed in Strasbourg in 1511 by Schott, but as it could not be identified, it is an open question whether it was the same ink that was used in Wechtlin's woodcuts. H. Wolff, *Buchornamentik im 15. Und 16. Jahrhundert*, 2 vols. (Leipzig: Verlag des Deutschen Buchgewerbevereins, 1913), quoted by C. Oldenbourg in *Die Buchholzschnitte des Hans Baldung Grien: Ein Bibliographisches verzeichnis ihrer Verwendungen* (Baden-Baden: Koerner, 1985; 1st ed. Baden-Baden: Heitz, 1962), 74, no. 309, L 59.

typical of tone blocks that were added to old and worn key blocks, which must have been at the printer's request.³⁴

Conclusions

Wechtlin was the most prolific designer of colour woodcuts in the early modern German-speaking lands, and

his oeuvre can now be dated more securely. A survey of all surviving impressions and an analysis of the palettes explains aspects of their production that were previously misunderstood. Additionally, it can be concluded that Wechtlin played no role in handing down the colour-printing technique from Augsburg to Strasbourg. A printer's knowledge would have been essential, and he may have produced colour woodcuts to such regular standards and only during such a short period because the creation of his prints, like the dissemination of colour printmaking in Strasbourg, is linked to his printer, Schott.

34 The way in which this complicates attributions of prints that were printed in colour only in later states is discussed in the Introduction, 18–19. On German printers' commissioning of tone blocks for this purpose in the later sixteenth century, see E. Savage, 'A Printer's Art', this volume, 94.

TABLE 9.1 *Colour Impressions of Wechtlin's Woodcuts: Group A: Designed c.1510*

	State 1a Impression from two blocks (with frame)			State 1b Impression from two blocks (with a different frame)		
	Black, blue	Black, green	Black, brown	Unknown	Black, green (green-grey)	Black, grey-brown
<i>VIRGIN AND CHILD IN A FRAME</i>	Basel KM (Aus. K. 8,64 X. 1390); Vienna, Albertina (DG 1949/646)	London BM (1873,0809.956)	Erlangen (Geisberg, 1930, no. 1486)	Boston MFA (Strauss, 1973, no. 21); Hamburg, KH (Lauts, 1959, no. 341)	Vienna, Albertina (DG 1949/645)	Paris, BNF (Ea 18c rés., pet. fol. EcN 1405)
<i>ST SEBASTIAN</i>	Paris, BNF (Ea 18c rés., pet. fol. EcN 1406)	London BM (1857,0613.344)		Hamburg, KH (Lauts, 1959, no. 340)	Vienna, Albertina (DG 1949/648)	
<i>THE CRUCIFIXION</i>	Paris, Frits Lugt (1545); Boston MFA (41.485); Vienna, Albertina (DG 1949/643)	London BM (1834,0804.37)				
<i>ST JEROME IN THE DESERT</i>						
<i>ST CHRISTOPHER</i>						

State 1c Impression from two blocks (without any frame)			State 2 Impression from three blocks (without frame)		
Black, grey-blue	Black, blue grey, light grey	Black, grey, light grey	Black, black, blue-grey	Black, black, grey	Black, green-grey, light green-grey
	Paris, Louvre, coll. Rothschild (755 rés.)	Paris, BNF (Ea 18c rés., pet. fol. EcN 1405)			
New York, Met. (19.25.b)				Berlin, SMB (95-3)	
		Dresden, SK (1891-212)			London, BM (1865,0708.93)
	Basel KM (Aus. K. 8,64 X.1391); Vienna, Albertina (DG 1949/647)				
			Berlin; SMB (95-3); Weimar SM (Geisberg, 1930, no. 1487)		

TABLE 9.2 *Colour Impressions of Wechtlin's Woodcuts: Group B: Designed c.1510–1513*

State 1a Impression from two blocks					
	Black, blue	Black, green (olive green or grey-green)	Black, grey	Black, brown	Unknown
<i>SKULL WITHIN AN ORNAMENTAL FRAME</i>	Berlin, SMB (215–1886); Paris, BNF (iEa 18c rés., pet. fol. EcN 1407); Washington, NGA (1946.21.360)	London, BM (1834.0804.38)			Boston, MFA (Strauss, 1973, no. 23)
<i>KNIGHT AND HALBERDIER</i>	Berlin, SMB (186, 97–3); Budapest, Museum of Fine Arts; Cincinnati, AM (1943.269); Coll. Laube Family; Munich, SGS (1928: 145); New York, Met. (17.50.44); Paris, BNF (Ea 18c rés., pet. fol. EcN 1411); Paris, Frits Lugt (1547); Paris, Louvre, coll. Rothschild (760 rés.); Vienna, Albertina (DG 1949/653); Washington, NGA (1943.3.8364)	Braunschweig, HAUM (V 6024); London, BM (1895.0122.204)	Cleveland, MA (1950.241)		
<i>VIRGIN AND CHILD ON A GRASSY BANK</i>	Basel KM (Aus. K. 8,63); Boston, MFA (21.10783); Munich SGS (1925: 493); Paris, BNF [Ea 18c rés., pet. fol. EcN 1404 (1) and 1404 (2)]; Paris, Frits Lugt (1546); Paris, Louvre, coll. Rothschild (754 rés.); Vienna, Albertina (DG 1949/644)	Berlin, SMB (KDA 186); London, BM (1895.0122.202); New York, Met. (20.84);			Hamburg, KH (Lauts, 1959, no. 339)
<i>PYRAMUS AND THISBE</i>	Paris, BNF (Ea 18c rés., pet. fol. EcN 1408a.); Paris, Louvre, coll. Rothschild (757 rés)				

State 1b Impression from two blocks (one of the block was scratched)		Other tone and line blocks (copy ?) Impression from two blocks		
Black, grey-green	Black, grey	Black, green	Black, grey	Black, grey-brown



Tone block: Cleveland, MA(1950.396)	London, BM (1834,0804.39)	Paris, BNF (Ea 18c rés., pet. fol. EcN 1408b)	Leyden UB (12934)
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TABLE 9.2 *Colour Impressions of Wechtlin's Woodcuts: Group B: Designed c.1510–1513 (cont.)*

State 1a Impression from two blocks					
	Black, blue	Black, green (olive green or grey-green)	Black, grey	Black, brown	Unknown
<i>ORPHEUS</i>	Basel, KM (X1392); Munich, SGS (1921:25 D); Paris, BNF (Ea 18c rés., pet. fol. EcN 1409); Paris, Louvre, coll. Rothschild (758 rés); Vienna, Albertina (DG1949/650)	Berlin, SMB (148.1880); London, BM (1842,0806.90); Vienna, Albertina (DG1949/649)			Boston, MFA (Strauss, 1973, no. 25)
<i>ALCON SLAYING THE SERPENT</i>	Berlin, SMB (96.3); Boston, MFA (21.1068); New York, Met. (19.25.3); Paris, BNF [Ea 18c rés., pet. fol. EcN 1410 (1) and 1410 (2)]; Paris, Frits Lugt (5117); Paris, Louvre, coll. Rothschild (759 rés); Stuttgart, SG (A 1910/9)	Cambridge, FM (1879.5.24-65); Chicago, AIC (1938.1128); Dresden, SK (1905- 397); Frankfurt-am- Main, SK (32565); London, BM (1845,0809.1019 and 1895,0122.203)	Vienna, Albertina (DG1949/651)	Munich, SGS (14715); Vienna, Albertina (DG1949/652)	Aschaffenburg, HSB (Geisberg, 1930, no.1493)
<i>PYRGOTELES</i>	Paris, Louvre, coll. Rothschild (761 rés)				

Copies:

Skull Within an Ornamental Frame: impression from two blocks (black, blue-grey), Paris, Louvre, coll. Rothschild (756 rés.).

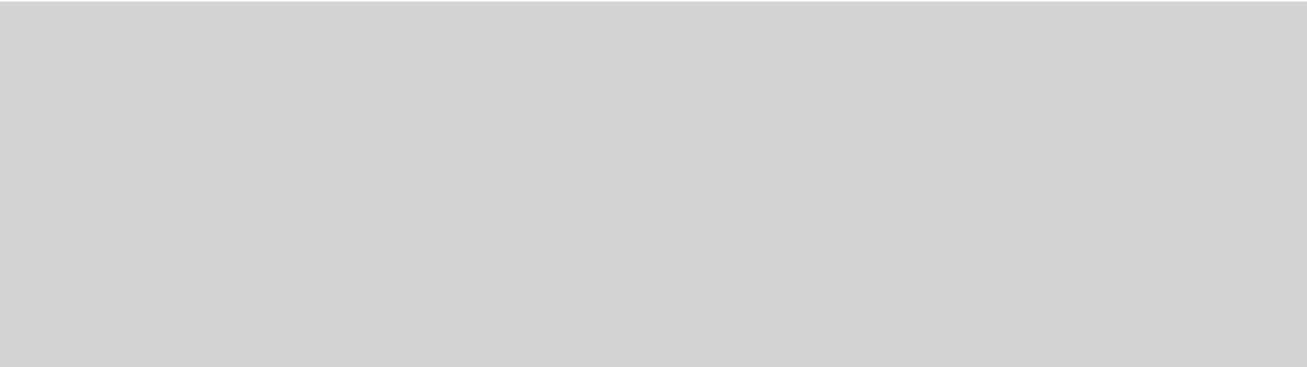
Orpheus: impression from two blocks (black, blue-grey), New York, Met. (22,50).

Alcon Slaying the Serpent: impression from two blocks (black, green-grey), New York, Met. (41.1.38).

Pyrgoteles: after State 1, impression from two blocks (black, grey), Washington, NGA (1943.3.8366).

after State 1a, impression from two blocks (black, light blue-grey), Vienna, Albertina (DG1949/654).

State 1b Impression from two blocks (one of the block was scratched)		Other tone and line blocks (copy ?) Impression from two blocks		
Black, grey-green	Black, grey	Black, green	Black, grey	Black, grey-brown



Line block: Berlin, SMB (116-3); London, BM (1908,0616.63); Munich, SGS (1935: 381)	Line block: Amsterdam, RPK (OB22288); Hamburg, KH (11292)
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Ugo da Carpi's *Diogenes*

Naoko Takahatake

In 1516, Ugo da Carpi petitioned the Venetian Senate for a privilege, claiming the invention of a method for printing '*chiaro et scuro*', a beautiful and instructive medium for those who delight in '*disegno*' (Introduction, Fig. 1, p. 6).¹ Nowhere in Ugo's description of this new technique does he introduce the idea of *colore*. Vasari, in the technical introduction prefixed to the 1550 edition of the *Vite*, refers to the process as '*stampe di legno di tre pezzi*' (woodcuts from three matrices).² In his records of specific chiaroscuro woodcuts by Ugo da Carpi, Antonio da Trento and Domenico Beccafumi, there is no mention of colour. Indeed, from the earliest descriptions, colour was not a primary consideration in the interpretation of Italian chiaroscuro woodcuts. It is, then, unsurprising that modern study of the Italian chiaroscuro woodcut has been principally matrix-centric in approach, remaining largely blind to the question of colour. While the ambition of the technique was not to be a colour woodcut as such, the formulation of colour inks was integral to a printmaker's aesthetic quest.

Ugo da Carpi's *Diogenes* after Parmigianino (c.1527–30, B.XII.100.10) is a *tour de force* of chiaroscuro block design, cutting and printing (Fig. 10.1). Seated in front of his barrel, Diogenes of Sinope looks down at a book before him and draws a length of fur to his chest. With the stick in his right hand he points to a second open book that bears the inscription: '*FRANCISCVS // PARMEN // PER VGO CARP*'. To the right stands a plucked chicken, acknowledging Plato's mockery of Man as a species of featherless biped. Through an intricate distribution of design over four blocks, Ugo masterfully models form, expresses movement and captures texture: the articulation of the Cynic's tensed musculature, the fluid swell and cascade of drapery, and the rough texture of the fowl's bared skin. Vasari

described the *Diogenes* twice in the *Vite*, once in the life of Marcantonio and again in the life of Parmigianino, praising the woodcut in no uncertain terms as a '*più bella stampa*' (a most beautiful print).³ The critical fortune of this superlative work has as much to do with its sophisticated design and technical bravura as it does with the large number of impressions that were printed. However, of the many known today, only a few were issued under Ugo's supervision and can therefore be said to represent his artistic intention. As we shall see, the colour inks used in later impressions reflect the tastes of publishers rather than those of the printmaker. Discriminating between early and posthumous printings is essential not only to an accurate evaluation of Ugo's contribution, but also to problems of attribution, chronology and the history of the blocks.

The earliest known chiaroscuro woodcut in Italy is Ugo's two-block *Saint Jerome* after Titian (B.XII.82.31), likely executed by 1516 in Venice, the year of his petition to the Senate. By this date, Ugo had cut a number of woodcuts, ranging from small book illustrations to monumental multi-block works. He was in Rome by 1518, as testified by the dated papal privilege found on his *Aeneas and Anchises* (B.XII.104.12) and *Death of Ananias* (B.XII.46.27). The bulk of his chiaroscuro woodcuts were executed in Rome after drawings by Raphael or Raphael's school and engravings by Agostino Veneziano and Marcantonio Raimondi. There is a marked technical development and innovation in his Roman prints, from the two-block *Sibyl* (B.XII.89.6), considered his first print after Raphael,⁴ to his

³ Vasari, *Vite*, 5: 15.

⁴ This print is described by Vasari and broadly accepted as Ugo's work. Vasari, *Vite*, 5: 15. Achim Gnann tentatively ascribed it to Antonio da Trento. A. Gnann, *Parmigianino und sein Kreis: Druckgraphik aus der Sammlung Baselitz*, exh. cat. (Munich: Staatliche Graphische Sammlung München, Alte Pinakothek, Munich and Frankfurt am Main, Städel Museum; Munich: Hatje Cantz, 2008), 172–73, no. 59. However, this print was recorded in the Ferdinand Columbus collection by Scribe A, who ceased work on the inventory around 1522, thus precluding an attribution to Antonio, who was not active at this early date. M.P. McDonald, *The Print Collection of Ferdinand Columbus (1488–1539): A Renaissance Collector in Seville*, 2 vols. (London: British Museum Press, 2004), 1: 154 and 2: 339, no. 1896. For a tentative attribution to Antonio da

¹ '*havendo io trovato modo di stampare chiaro et scuro, cosa nova, et mai più non fatta, et [esta] cosa bella et utile a molti chi haverà piacer di disegno*'. 24 July 1516, Archivio di Stato, Venice, Notatorio di Collegio, registro 18, 7 March 1515–27 August 1520, c. 39, published in M. Rossi ed., *Ugo da Carpi, l'opera incisa: xilografie e chiaroscuri da Tiziano, Raffaello e Parmigianino*, exh. cat. (Carpi: Comune di Carpi, 2009), 182, document 37.

² G. Vasari, *Le vite de' più eccellenti pittori scultori e architettori nelle redazioni del 1550 e 1568*, ed. R. Bettarini and P. Barocchi, 6 vols. (Florence: Sansoni, 1966–87), 1: 170–71.



FIGURE 10.1 Ugo da Carpi, after Parmigianino, *Diogenes*, c.1527–30, chiaroscuro woodcut from four blocks, 48.1 × 35.2 cm
BOSTON, MUSEUM OF FINE ARTS, BEQUEST OF W.G. RUSSEL ALLEN, 64.1085; PHOTOGRAPH
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four-block prints such as the *Death of Ananias* and *Massacre of the Innocents* (B.XII.34.8) after Agostino Veneziano and Marcantonio Raimondi respectively. The variety of approaches to translating designs from a range of sources powerfully demonstrates Ugo's interpretative agency and his autonomy as a blockcutter operating independently. He must have strategised these subtle distributions of designs over multiple blocks and conceived the elegant juxtapositions and meticulous layering of prepared inks in different palettes.⁵ What is more, the

Trento, see also A. Gnann, *In Farbe! Clair-obscur-Holzschnitte der Renaissance. Meisterwerke aus der Sammlung Georg Baselitz und der Albertina in Wien*, exh. cat. (Vienna: Albertina; Munich: Hirmer Verlag GmbH, 2013), 162–63, no. 72, which was published as this current volume was going to press. In his interpretation of this and other prints, Gnann reached different conclusions to those discussed in this essay.

5 In 1503, Ugo hired Saccaccino Saccaccini to help execute painting commissions in and around Carpi. The contract stipulates Ugo's

increasing refinement of his cutting demanded ever more precision of block registration, which he must also have engineered.

The fact that Ugo was the blockcutter, printer and publisher of these woodcuts is attested by the 1518 papal privilege inscribed on the *Aeneas and Anchises* and *Death of Ananias*: 'apud Ugum de Carpi impressam'. Not only did he possess the executive skills and financial wherewithal to generate and publish his own prints,⁶ but he also took great measures to protect his investments.⁷ There is therefore little reason to suppose that he was among those printmakers in the immediate circle of Raphael working with the publisher Baviero de' Carrocci, called il Baviera. The early impressions of Ugo's chiaroscuro woodcuts are extremely scarce, suggesting limited editions for a small and sophisticated market of collectors.⁸ Had he availed himself of il Baviera's channels of distribution, we might expect a commercial scale of production more comparable to that of the latter's intaglio prints.⁹

Ugo became acquainted with Parmigianino shortly after the painter's arrival in Rome in 1524. This association is confirmed by Ugo's only known painting, *Veronica with the Sudarium Flanked by Saints Peter and Paul* (c.1525), after a drawing by Parmigianino.¹⁰ The *Diogenes* is the only signed and unanimously accepted print by Ugo that

sole responsibility for acquiring colours. While this may merely attest to a financial responsibility, it may be that Ugo developed his proficiency working with colour at this time. S. Santini, 'Ugo da Carpi, note per una biografia', in Rossi ed., *Ugo da Carpi*, 20.

6 Ugo was born into a situation of privilege in Carpi, and documents from 1495 to 1502 record his involvement in the administration of his properties. Santini, 'Ugo da Carpi', 20.

7 Ugo obtained another Papal privilege in 1525 for his calligraphy manual, *Operina di Ludovico Vicentino da imparare di scrivere lettera cancellerescha* (Rome: [s.n.], 1525).

8 I know of five or fewer impressions of some of Ugo's chiaroscuro woodcuts, including *Saint Jerome*; the first version of *Hercules Chasing Avarice from the Temple of the Muses* (B.XII.133.12); *Hercules Strangling the Nemean Lion* (B.XII.117.15); *Hercules Crushing Antaeus* (B.XII.117.14); and *Aeneas and Anchises*. As Michael Bury noted, we have little information about the original audience for chiaroscuro woodcuts, although the sophistication of the images implies a knowledgeable clientele. M. Bury, 'Italian Chiaroscuro Woodcuts', review of D. Graf and H. Mildenberger, *Chiaroscuro: Italienische Farbholzschnitte der Renaissance und des Barock*. *Print Quarterly* 20 (2003), 418.

9 Bury remarked that the channels of distribution for chiaroscuro woodcuts were distinct from those of intaglio prints. Bury, 'Italian Chiaroscuro Woodcuts', 418.

10 The drawing is now in the Uffizi. R. Harprath in *Raffaello in Vaticano*, ed. Fabrizio Mancinelli, exh. cat. (Vatican City; Milan: Electa, 1984), 324–25, no. 123. The painting is in the Archivio della Fabbrica di San Pietro, Vatican.

is after a design by Parmigianino. There is a lack of consensus regarding the extent of their collaboration in the production of chiaroscuro woodcuts. Following attributions first put forth by Adam von Bartsch in 1811, some authors have assigned to him many of the chiaroscuro woodcuts after Parmigianino.¹¹ However, as I have argued elsewhere, their cutting technique, ink formulations, choice of palettes, printing practices and block histories are to be associated with Niccolò Vicentino's workshop.¹² These unsigned prints are similar in their distribution of design over multiple blocks to the *Christ Healing the Lepers* (B.XII.39.15), also after Parmigianino, one of five prints Vicentino signed. For example, the three-block *Surprise*, like the *Christ Healing the Lepers*, is composed of a light tone block to establish the ground from which white highlights are cut; a mid-tone block to describe the main outlines of the design; and a dark block to reinforce the contours and express the darkest shadows through long hatchings rather than broad areas of colour. Also critical to discriminating between Ugo and Vicentino's output are the characteristics of printing, in particular the selection of colours. The latter's shop preferred palettes in highly saturated hues, ranging from greens, violets, reds, browns and blues. In the main, as described in detail by Morenus, Vicentino's inks are formulated with coarsely ground pigments and applied in thick, opaque layers. In contrast, those in early impressions of Ugo's securely attributed prints are in muted hues, finely formulated and printed in uniform, transparent panes. Comparison of the green inks in the Boston *Diogenes* and the London

Christ Healing the Lepers illustrates this distinction (Figs. 10.1–10.2).¹³

As the stock of woodblocks in Vicentino's shop expanded, he issued more and larger 'editions'.¹⁴ Printing several different blocks with a single batch of ink allowed for one block to be inked up while another was being run through the press. This proto-assembly line procedure also had the advantage of building a stock of impressions of each print in different palettes, a resort to expediency further suggested by the frequent misregistration of blocks and the prevalence of offsets on the versos.¹⁵ Vicentino's workshop practices may indicate a broadening of the market for chiaroscuro in mid-century Italy, whereas there is little to suggest that Ugo was printing his blocks in this manner. The divergent block histories of Vicentino's stock and the blocks securely assigned to Ugo – including the *Diogenes* – underscore the discrete operations of these two shops.¹⁶

The tonal integration that Ugo sought through his use of finely ground, translucent inks in analogous hues is exemplified in the recently described first state of the



FIGURE 10.2 Niccolò Vicentino, after Parmigianino, *Christ Healing the Lepers*, 1540s, *chiaroscuro woodcut from three blocks*, 30 × 40.9 cm
LONDON, VICTORIA AND ALBERT MUSEUM, E.288–1890;
© VICTORIA AND ALBERT MUSEUM, LONDON

11 *Saints Peter and John* (B.XII.77.26), *Nymphs Bathing* (B.XII.122.22), *Pan and Dispute of Marsyas* (B.XII.123.24), *Honours Rendered to Psyche* (B.XII.125.26), *Surprise* (or *Achaemendes*) (B.XII.146.10) are given to Ugo by the following authors: L. Servolini, *Ugo da Carpi* (Florence: La Nuova Italia, 1977); K. Oberhuber and A. Gnann, *Roma e lo stile classico di Raffaello 1515–1527*, exh. cat. (Mantua: Palazzo Te and Vienna: Albertina; Milan: Electa, 1999); Gnann, *Parmigianino und sein Kreis*; Rossi ed., *Ugo da Carpi*; Gnann, *In Farbe!*. However, Ugo's authorship was rejected by W.H. Trotter, 'Chiaroscuro Woodcuts of the Circles of Raphael and Parmigianino: A Study in Reproductive Graphics' (PhD diss., University of North Carolina, Chapel Hill, 1974); J. Johnson, 'Ugo da Carpi's Chiaroscuro Woodcuts', *Print Collector* 57–58 (1982); M. Matile, *Italianische Holzschnitte der Renaissance und des Barock: Bestandskatalog der Graphischen Sammlung der ETH Zurich* (Basel: Schwabe, 2003).

12 N. Takahatake, 'Niccolò Vicentino's *Miraculous Draught of Fishes*', *Print Quarterly* 28 (2011), 258. The only written record we have of Vicentino as a printmaker is Vasari's report that he made chiaroscuro woodcuts after Parmigianino's death in 1540. Vasari, *Vite*, 5: 15–16.

13 Boston, Museum of Fine Arts, 64.1085 and London, Victoria and Albert Museum, E.288–1890. See B. Price *et al.*, 'A Technical Study', this volume, 144, for analysis of the printing ink materials in the London *Christ Healing the Lepers*.

14 For a chronology of these editions, see L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 134–39; for the editioning of contemporary German colour woodcuts, see A. Klein, 'Hans Wechtlin', this volume, 103–15.

15 See L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 130.

16 See L. Morenus, *Ibid.*, 125.

Diogenes (see Fig. 10.1).¹⁷ Changes to the block between this and the subsequent state amount to no more than the removal or loss of a small area of shading on the philosopher's thigh. The first state impressions are significant, however, for what they reveal about the earliest printings of the *Diogenes*. They are printed in similar palettes of blue-green inks, with the darkest block printed in grey rather than black. Due to the quality and limited chromatic range of the inks, the transition from one block to the next is exceptionally subtle. In his *Traité historique et pratique de la gravure en bois* (1766), Jean Michel Papillon describes Ugo's chiaroscuro woodcuts from three and four blocks as having the appearance of being made with a brush. Because they are printed in smooth transitions of a monochrome palette, he regards them as an excellent imitation of chiaroscuro painting.¹⁸ By superimposing sheer films of inks that appear to blend, Ugo created intermediate tones without using additional blocks.

In some impressions of later printings of the subsequent state, the three lighter blocks are printed in gradations of one colour with the darkest in black (Fig. 10.3).¹⁹ The tonal unification of the earliest printings is lost. The staccato appearance of the darkest block against the rest of the composition disrupts the subtle modelling and can only be judged a lapse in quality. There is nothing to indicate they were printed at a remove from Ugo other than this difference of inks, for no publisher ever added his name to the blocks. Yet they were doubtless made by a printer working without Ugo's counsel. The blocks underwent multiple campaigns of printing, likely throughout the sixteenth century, the latest showing the usual signs: cracks, losses, and wormholes. Their inks depart even further from Ugo's intentions, as brown inks seemingly never considered by Ugo became preferred. The quality and consistency of their ink is also aberrant: in an impression in yellow, browns and black, the opaque inks lay down flat areas of colour rather than building up the composition in



FIGURE 10.3 Ugo da Carpi, after Parmigianino, *Diogenes*, c.1527–30, chiaroscuro woodcut from four blocks, 48.5 × 34.8 cm
PARIS, ÉCOLE NATIONALE SUPÉRIEURE DES BEAUX-ARTS, EST. MAS.79; © BEAUX-ARTS DE PARIS, DIST. RMN-GRAND PALAIS/ART RESOURCE, NY

translucent panes (Fig. 10.4).²⁰ The printing order in this impression also deviates from the standard light-to-dark sequence, and the inversion of the two middle blocks renders the third hardly legible. Thus, it is not possible to discern the shading in the third block on Diogenes's proper left shoulder. These variations may be a deliberate attempt to disguise wear to the block. While the composition is still coherent, the chiaroscuro effects are not convincing.

Ugo's *Diogenes* is close in design to an engraving by Jacopo Caraglio that was made in Rome before 1527 (B.XV.94.61). Arthur Popham, followed by Jan Johnson, posited that the chiaroscuro woodcut was made after Caraglio and thus at a remove from Parmigianino.²¹

17 Boston, Museum of Fine Arts 64.1085. See N. Takahatake, 'Ugo da Carpi', review of M. Rossi ed., *Ugo da Carpi, l'opera incisa: xilografie e chiaroscuri da Tiziano, Raffaello e Parmigianino. Print Quarterly* 27 (2010), 321. Additional impressions include: Los Angeles, UCLA Grunwald Center for the Graphic Arts, 1962.19.79; London, Victoria and Albert Museum, EW.120, and Oxford, Ashmolean Museum, WA1863.1692. The Blanton Museum of Art, 2005.16, in Austin, Texas, and the Saint Louis Art Museum, 23.1984, also hold first state impressions, which I have seen in reproduction only.

18 J.M. Papillon, *Traité historique et pratique de la gravure en bois*, 2 vols. (Paris: Simon, 1766), 1: 392–93.

19 Paris, École nationale supérieure des Beaux-Arts, Est. Mas. 79.

20 Los Angeles County Museum of Art, M.88.91.18.

21 A.E. Popham, 'Observations on Parmigianino's Designs for Chiaroscuro Woodcuts', in *Miscellanea I.Q. Regteren Altena* (Amsterdam: Scheltema & Holkema, 1969), 50; Johnson, 'Ugo da Carpi's Chiaroscuro Woodcuts', 82, no. 15.



FIGURE 10.4 Ugo da Carpi, after Parmigianino, *Diogenes*, c.1527–30, chiaroscuro woodcut from four blocks, 47.9 × 35.1 cm
LOS ANGELES COUNTY MUSEUM OF ART, MARY STANSBURY RUIZ BEQUEST, M.88.91.18; PHOTO © MUSEUM ASSOCIATES/LACMA

Popham's proposal was rejected by William Henry Trotter and by subsequent scholars, and it is now agreed Parmigianino must have been directly involved.²² In light of the disparity of size, compositional details and quality, David Landau and Peter Parshall reversed the order of priority between the woodcut and intaglio print, observing that Ugo's masterpiece could not have derived from the engraving. According to Landau and Parshall, the woodcut thus was made in Rome before 1527.²³ However, Achim Gnann and David Ekserdjian posited that each print required its own preparatory study. Given Parmigianino's profound interest in printmaking at this time, they argued that he wished to explore the artistic possibilities of two different techniques and worked on the intaglio and woodcut at much the same time, around 1526/1527 in

Rome.²⁴ This was confirmed by Ekserdjian's discovery of a preparatory drawing for Caraglio's engraving, replete with details absent in the woodcut.²⁵ Although preliminary sketches record the development of Parmigianino's thoughts, a *modello* for the chiaroscuro woodcut is not known. An analogous example of Parmigianino reconceiving a design for an engraving and chiaroscuro woodcut is the *Martyrdom of Saints Peter and Paul*, executed by Caraglio (B.XV.71.8) and Antonio da Trento (B.XII.79.28), respectively. As with the two versions of the *Diogenes*, the design in both prints is in the same direction and the engraving is smaller. As Ekserdjian noted, the design for the chiaroscuro woodcut is simplified, presumably to accommodate the limitations of the medium.²⁶ In the case of the *Martyrdom*, the engraving was made in Rome before the Sack of 1527 while the chiaroscuro woodcut was made shortly thereafter in Parmigianino's workshop in Bologna.

In light of the disparity in cutting styles of their respective prints after Parmigianino, Popham precluded a relationship between Ugo and Antonio – and thus the former's activity in Bologna.²⁷ Whereas Ugo's *Diogenes* is composed primarily of planes of colour, Antonio's prints are more linear. However, it is important to note that a blockcutter might produce substantially different results depending on the model he followed. Thus, as Bury remarked, it is questionable whether we can make attributions based on personal styles of cutting alone.²⁸ Popham suggested that Parmigianino drew directly onto the block for Antonio, and indeed the latter's two-block chiaroscuro woodcuts capture the appearance of pen drawings.²⁹ Resolving the design of each of the four blocks in the *Diogenes*, by contrast, would have been a staged process requiring a different kind of instruction from the designer and greater input from the blockcutter.³⁰

There are, however, strong affinities in the colour inks between the earliest impressions of Ugo's chiaroscuro woodcuts and those by Antonio made after Parmigianino

²² Trotter, 'Chiaroscuro Woodcuts', 164.

²³ D. Landau and P. Parshall, *The Renaissance Print, 1470–1550* (New Haven, London: Yale University Press, 1994), 154.

²⁴ Oberhuber and Gnann, *Roma e lo stile classico*, 396–97, nos. 301, 302; D. Ekserdjian, *Parmigianino* (New Haven: Yale University Press, 2006), 216–39. Gnann, *In Farbe!*, 139–40, no. 53, 54, and 55.

²⁵ D. Ekserdjian, 'Two Drawings by Parmigianino for Prints', *Master Drawings* 46 (2008), 369–72.

²⁶ Ekserdjian, *Parmigianino*, 220.

²⁷ Popham, 'Observations on Parmigianino's Designs', 50.

²⁸ Bury, 'Italian Chiaroscuro Woodcuts', 418.

²⁹ Popham, 'Observations on Parmigianino's Designs', 49.

³⁰ On how the distribution of a design over multiple blocks could be achieved, see N. Takahatake, 'Coriolano', *Print Quarterly* 28 (2010), 104–105.

in Bologna. First, the inks are finely formulated and do not evidence coarsely ground pigment particles, as in the case of Vicentino's workshop. Second, the inks are applied in thin, translucent layers, as exemplified by the impressions of *Man Seen from Behind* (B.XII.148.13) and the *Martyrdom of Saints Peter and Paul*, described by Morenus.³¹ Finally, the darkest block in Antonio's prints is often in grey rather than black, for greater tonal unification on the order of the *Diogenes*.³² It is questionable whether Parmigianino, after the experience of executing one or two prints with Ugo, would have acquired enough familiarity with this nascent technique to teach Antonio such intricacies as the preparation of refined colour printing inks or the registration of blocks.³³ The more plausible authority is Ugo, who seems to have been the only practitioner of chiaroscuro woodcuts in Italy at the time Antonio took up the medium.³⁴ We must, therefore, consider the possibility that Ugo worked alongside

Antonio in Bologna, and more specifically in Parmigianino's workshop.

Parmigianino was deeply invested in printmaking in Bologna, where he lived from 1527 to 1530, executing his own etchings and providing designs for other printmakers. Vasari identified four chiaroscuro woodcuts by Antonio made in collaboration with Parmigianino in these years, and they are his most accomplished: the *Martyrdom of Saints Peter and Paul*; *Madonna and Child* (B.XII.56.12); *Man Seen from Behind*; and *Augustus and the Tiburtine Sibyl* (B.XII.90.7).³⁵ Vasari also placed Ugo's *Diogenes* in this Bolognese workshop, and while his testimony about the authorship of the print is confused, there is some evidence to support his claim.³⁶ The Oxford first state impression of the *Diogenes*³⁷ is printed on paper with a Letter 'N' in a Circle watermark also found on an early impression of Antonio's *Martyrdom of Saints Peter and Paul*.³⁸ Furthermore, an early second state impression of the *Diogenes* is printed on paper with a Heart-shaped Crossbow with Arrow.³⁹ This same watermark appears on a first state impression of Parmigianino's etching of *The Entombment* (second version, B.XVI.8.5).⁴⁰ This is generally considered Parmigianino's last and most accomplished etching, and accordingly is dated by some scholars towards the end of his Bolognese sojourn.⁴¹ The proximity

31 For a more detailed description of the workshop characteristics see L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 128.

32 Analysis conducted by Charlotte Eng and Diana Rambaldi at the Los Angeles County Museum of Art using digital microscopy and x-ray fluorescence spectroscopy has identified the presence of orpiment in the darkest ink of the museum's impressions of Ugo da Carpi's *Diogenes* (M.2001.176) and Antonio da Trento's *Madonna and Child* (M.88.91.173). This yellow pigment, mixed into the carbon black, produced a grey ink, thus confirming the calculated pursuit of this aesthetic effect.

33 Parmigianino has been associated with the design of Ugo's seemingly unfinished *Archimedes* (B.XII.97.6), however this remains controversial. The print has been variously described as being after Raphael, after a Parmigianino drawing derived from Raphael, or after a Raphael drawing modified by Parmigianino. Although Johnson considers this to be Ugo's last chiaroscuro woodcut (Johnson, 'Ugo da Carpi's Chiaroscuro Woodcuts', 72–76), Gnann has more recently dated the print to Ugo's years in Rome (Gnann, *In Farbe!*, 108–109, no. 38). The unique impression in the Albertina (DG2002/524) is printed on paper with a Crossbow in Circle Surmounted by a Star watermark (reproduced in Gnann, *In Farbe!*, p. 441). This same watermark is found on examples of Ugo's two prints dated 1518: *Aeneas and Anchises* (Amsterdam, Rijksmuseum, 31.054) and *Death of Ananias* (without the inscription in the step) (London, British Museum, 1852.0612.1). I am grateful to Shelley Langdale for sharing watermark information from the Rijksmuseum.

34 For a discussion of the British Museum's copy in reverse of Hans Baldung's *Preparation for the Witches' Sabbath*, attributed to Lucantonio degli Uberti and dated 1516 (1852.0612.105), see E. Savage, 'A Printer's Art', this volume, 102. If the attribution is correct, this would appear to be the only known chiaroscuro woodcut by the printmaker who was active in Florence and Venice.

35 Vasari, *Vite*, 5: 15–16.

36 In the life of Marcantonio, Vasari states that '*Francesco Parmigiano intagliò in un foglio reale aperto un Diogene*' (Parmigianino cut a *Diogenes* the size of an unfolded royal sheet) whereas in the life of Parmigianino, he writes that the painter '*fece intagliare [...] un Diogene grande*' (had a large *Diogenes* cut). Vasari, *Vite*, 5: 15 and 4: 539.

37 Oxford, Ashmolean Museum, WA1863.1692.

38 Amsterdam, Rijksmuseum, 31.276.

39 Graphische Sammlung der ETH Zürich, D.8, Matile, *Italianische Holzschnitte*, 132, no. 53; watermark no. 24.

40 San Francisco, Achenbach Foundation for Graphic Arts, 2000.156.27.

41 K. Oberhuber, 'Parmigianino als Radierer', *Alte und Moderne Kunst* 8 (1963), 33–36; A.E. Popham, *Catalogue of the Drawings of Parmigianino* (New Haven: Yale University Press, 1971) 1: 14; S. Welsh Reed and R. Wallace, *Italian Etchers of the Renaissance and Baroque*, exh. cat. (Boston: Museum of Fine Arts, Cleveland: Cleveland Museum of Art and Washington: National Gallery of Art, 1989), 13–14, no. 9; Landau and Parshall, *The Renaissance Print*, 269–70. Gnann, Ekserdjian and Franklin consider both versions of *The Entombment* to have been executed in Rome, on the basis of comparison with related drawings. Gnann, *Parmigianino und sein Kreis*, 35–38, nos. 3, 4; D. Franklin, *The Art of Parmigianino* (New Haven: Yale University Press, 2003), 153–57, nos. 36, 37; Ekserdjian, *Parmigianino*, 235. I wish to thank Catherine Jenkins for helpful discussions regarding Parmigianino's etchings.

of chiaroscuro printing to Parmigianino's own etching production accords well with Vasari's suggestion that he and Antonio worked side by side on prints.⁴² The tentative implication is that Parmigianino and his printmakers had access to two presses in his Bolognese workshop, which is supported by Parmigianino's singular experiment in etching with two tone blocks, *Saints Peter and John Healing the Lame Man* (B.XVI.9.7).

Ugo's activity alongside Antonio in Bologna is further supported by the subsequent shared histories of their blocks. Ugo's *Diogenes*,⁴³ *Death of Ananias*⁴⁴ and *Deposition* (B.XII.43.22),⁴⁵ were later printed in the same shop as Antonio's *Martyrdom of Saints Peter and Paul*,⁴⁶ and *Augustus and the Tiburtine Sibyl*,⁴⁷ in a brown, green-brown, and black palette on paper with a Letter 'F' over Triple-mount watermark (see Figs. 10.3 and 10.5).⁴⁸ Although the *Deposition* and *Death of Ananias* are dated to Ugo's Roman years, Johnson posited the existence of deceptively close copies of both compositions.⁴⁹ If the green-brown impressions of these two prints represent such near-replica versions, then they may have been cut in Bologna together with the *Diogenes*. This would help explain why these three works by Ugo enjoyed such long publishing histories while most others – including his *Aeneas and Anchises*, for which he obtained a privilege – are not known in late printings. Indeed, Ugo may not have carried his stock of Roman blocks to Bologna.

Scholarship on Ugo da Carpi's chiaroscuro woodcuts, particularly on the *Diogenes*, has focused on the elements of style expressed in the design and blockcutting. However, an examination of the totality of material evidence



FIGURE 10.5 *Antonio da Trento, after Parmigianino, Augustus and the Tiburtine Sibyl, c.1527–30, chiaroscuro woodcut from two blocks, 34.7 × 26.7*
LONDON, BRITISH MUSEUM, 1904,0226.13; © TRUSTEES OF THE BRITISH MUSEUM

encourages us to consider Ugo's activity in Bologna and the early development of the medium in Parmigianino's workshop. Close scrutiny of colour inks and paper can help clarify the workshop whence a print emerged and thus advance our understanding of the chronology of production, attributions and associations between printmakers. The role of later printers of Ugo's chiaroscuro appears largely to have escaped attention as the blocks themselves are silent in this regard. Their interventions can nevertheless be discerned by variations in colour inks that depart from the subtle refinement of those encountered in impressions executed entirely under Ugo's direction. Although much confusion about attribution has derived from the study of such unrepresentative impressions, these late printings are valuable documents of the taste for chiaroscuro woodcuts in Italy through the sixteenth century.

42 Vasari, *Vite*, 4: 539–40.

43 London, British Museum, 1859,0709.2376 and Paris, École nationale supérieure des Beaux-Arts, Est. Mas.79.

44 London, British Museum, 1895,0122.1234.

45 Graphische Sammlung der ETH Zürich, D.44; Matile, *Italianische Holzschnitte*, 116, no. 46.

46 London, British Museum 1920,0512.27.

47 London, British Museum 1904,0226.13, Paris, EnsBA, Est. Mas. 86, and Frankfurt, Städel Museum 33892.

48 Matile identified the Letter 'F' watermark with one recorded by Woodward in a map of Piacenza of c.1580, printed in Rome. Matile, *Italianische Holzschnitte*, 124, no. 49 and D. Woodward, *Catalogue of Watermarks in Italian Printed Maps, ca. 1540–1600* (Florence: University of Chicago Press, 1996), 191, no. 333.

49 Johnson, 'Ugo da Carpi's Chiaroscuro Woodcuts', 52–53, no. 9 and 63–67, no. 12.

The Chiaroscuro Woodcut Printmaking of Ugo da Carpi, Antonio da Trento and Niccolò Vicentino: Technique in Relation to Artistic Style

Linda Stiber Morenus

The chiaroscuro woodcut emerged in Italy around 1516 as a way to print woodcuts that, as Vasari noted, imitate wash drawing.¹ Differentiating the working methods of three early and prolific practitioners, Ugo da Carpi, Antonio da Trento and Niccolò Vicentino, is fundamental to the attribution of their much-debated output.² This research applies a diagnostic approach that relies on systematic analysis of physical evidence, such as ink character, palettes, manner of printing and chronology of woodblock states and wear, to individuate the workshop practices of these printmakers. The methodology is informed by practical knowledge gained from recreating chiaroscuro woodcuts and by comparing these models to historic originals.

The greatest weight has been given to evidence derived from early impressions, reasoning that they are closest to the printmaker's intention. The technical examination of over 1,400 impressions of sixteenth- to seventeenth-century Italian chiaroscuro woodcuts points to a re-distribution of authorship. Characterizing the accepted production of the three blockcutters helps to assign impressions with contested attribution to workshops of origin. Moreover, study of their respective materials and printing processes reveals links or collaboration between printmakers. These overlaps contribute to the confusion about authorship and make it particularly important to distinguish the independent qualities of their craftsmanship. The evidence also provides clues to whether each printmaker assumed responsibility for aspects of print production beyond block cutting.

The study proves that chiaroscuro printmaking attained a far more commercial scale than previously thought. Rather than individual experiments in colour, chiaroscuro woodcuts often were executed in editions, wherein multiple impressions of the same composition were issued in one palette composed of the same batch of inks.³ At least some of the works cut by Ugo and Antonio were published

in this economical manner. Vicentino's production constitutes a special case, in that many different compositions were printed using one palette composed of the same batch of inks. For example, his shop prepared a batch of lime, green and black inks to print numerous impressions of seventeen different chiaroscuro woodcuts.

Sets of chiaroscuro woodblocks were negotiable commodities that readily changed hands. In one instance, the blocks for twenty-one different woodcut compositions (half of Vicentino's proposed workshop production) were published sequentially by three different shops over a period of approximately seventy years from the 1540s to c.1610. Each shop produced a distinct graphic statement from this cache of blocks and each can be identified by its characteristic techniques and materials.

As articles of value, chiaroscuro woodblocks were often retained and reused, even as their condition degenerated. Of the major workshops addressed by this investigation, some controlled their stock of blocks relatively briefly, while others retained them long enough or employed them extensively enough for breaks, losses and insect infestation to propagate. Thus, when the printmaker Andrea Andreani finally acquired the aforementioned cache of worn Vicentino woodblocks, he re-cut some of the blocks or cut replacements.⁴

What follows is a summary of the lessons learned from recreating chiaroscuro woodcuts, a characterization of the known woodcuts produced by Ugo, Antonio and Vicentino, a proposed re-distribution of certain impressions to workshops of origin, and a reflection on the scope of each printmaker's workshop productivity.

Chiaroscuro Woodcut Recreations: Practical Lessons

The chiaroscuro woodcut recreations imitate a three-block composition, *Saints Peter and John*,⁵ and demonstrate the

1 E. Lincoln, *The Invention of the Italian Renaissance Printmaker* (New Haven: Yale University Press, 2000), 80.

2 On the influence of their chiaroscuro prints on the chiaroscuro woodcuts after designs by the Northern artist Frans Floris, see E. Wouk, "Divine, August and Immortal", this volume, 151–60.

3 For evidence of this practice in the German-speaking lands in the early sixteenth-century, see A. Klein, 'Hans Wechtlin', this volume, 103–15.

4 N. Takahatake, 'Niccolò Vicentino's *Miraculous Draught of Fishes*', *Print Quarterly* 28 (2011), 260; J. Johnson, 'Ugo da Carpi's Chiaroscuro Woodcuts', *Print Collector* 57–58 (1982), 10.

5 (B.XII.77.26) Washington, D.C., Library of Congress, XVI-C298,28.

causal relationship between printing practice and print appearance. Typically prints are executed on damp paper which conforms more intimately to a printing matrix than if dry. The intimate contact ensures that the ink is evenly transferred from the woodblock to the sheet and appears slightly embedded in the paper surface. Unless the ink is exceptionally liquid and considerable pressure is used, printing on a dry sheet results in paper 'show-through'. Commonly the 'show-through' takes on the pattern of the paper surface. Each time a sheet of paper is dampened for printing it expands – then contracts when dry. Making a chiaroscuro woodcut print requires that two or more blocks be superimposed and correctly aligned on the same sheet of paper. If printed on damp paper, it is likely that the sheet will shift in size while receiving each block, causing mis-registration of the blocks. The damper the paper and the larger the print dimensions, the greater is the challenge of registration.

Over-printing with wet ink onto dry ink results in a very different visual effect than over-printing wet ink onto wet ink. Ink layers appear discrete when printed wet onto dry, regardless of how damp the sheet is. Ink layers appear merged or blended when printed wet onto wet, again irrespective of the paper dampness. Ink of widely varying viscosity is produced by different formulations. As a consequence of viscosity, printed ink films can range in appearance from sheer and wash-like to thick and pasty.

'Squash' is a term referring to the spread of ink beyond the area of contact between the block and paper, and is characteristic of the woodcut printing process (Fig. 11.1). Scaling up the pressure produces a feature that can be termed 'channelled squash', wherein the ink is spread off



FIGURE 11.1 *Chiaroscuro recreation, key block only. 'Squash' resulting from printing with moderate pressure*
Photomicrograph, raking illumination

the edge of the block, allowing the paper to show through (Fig. 11.2). Since pressure is responsible for producing 'channelled squash', it is commonly accompanied by embossment of the sheet from the woodblock and is commensurate with the degree of pressure applied. Understanding the variables involved in chiaroscuro woodcut printing informs our interpretation of historic impressions.

Ugo da Carpi

Ugo da Carpi is documented as having cut fourteen chiaroscuro woodcuts after the designs of Titian, Baldassare Peruzzi, Raphael and Parmigianino.⁶ Twelve bear his signature; two more are assigned to him by Vasari.⁷ Many others are tentatively attributed to him. (Alternatively,



FIGURE 11.2 *Chiaroscuro recreation, key block only. 'Channelled squash' resulting from printing with greater pressure*
Photomicrograph, raking illumination

6 Johnson, 'Ugo da Carpi', 2–88; M. Rossi, ed., *Ugo da Carpi, l'opera incisa: xilografie e chiaroscuri da Tiziano, Raffaello e Parmigianino*, exh. cat. (Carpi: Comune di Carpi, 2009).

7 These are: *St Jerome in the Wilderness* (B.XII.82.31), *Sibyl Reading, facing right* (B.XII.89.6), *Hercules Chasing Avarice from the Temple of the Muses* (B.XII.133.12i) and another version (B.XII.133.12ii), *Hercules Strangling the Nemian Lion* (B.XII.117.15), *Hercules Crushing Antaeus* (B.XII.117.14), *Descent from the Cross* (B.XII.43.22), *Venus and Cupids* (B.XII.107.3), *Raphael and his Mistress* (B.XII.140.2), *Massacre of the Innocents* (B.XII.34.8), *Aeneas Fleeing Troy with Anchises and Ascanius* (B.XII.104.12), *Death of Ananias* (B.XII.46.27), *David and Goliath* (B.XII.26.8) and *Diogenes* (B.XII.100.10). G. Vasari, *Lives of the Painters, Sculptors and Architects*, trans. G. du C. De Vere, 2 vols. (New York: Alfred A. Knopf, 1996) 2: 88.

some of these woodcuts have been given to Antonio or Vicentino.)⁸

Early impressions of the fourteen woodcuts securely attributed to Ugo are imbued with a distinctive workshop discipline beginning with his first two-block chiaroscuro compositions such as the *St Jerome*,⁹ and extending to his final four-block masterpiece, *Diogenes*.¹⁰ The prints exhibit intricate cutting and a precise, controlled printing technique. Generally the inks are matte, are printed in thin to very thin films that show slight 'squash' or even slight 'channelled squash', and have very finely ground pigments. His palettes include muted browns, greys, blues, greens and light pink. Ugo's three- and four-block designs deploy shades and tints of a single hue or low-contrast, analogous colour schemes.

Typically, the colours in Ugo's woodcuts are printed from lightest to darkest. There are exceptions; in some first-state or early second-state impressions of the *Descent from the Cross*, a three-block design, the lighter colours of the tone blocks are printed over the dark key block, minimizing contrast and tonally unifying the composition.¹¹ Frequently, the mid-tone block of the *Descent* is executed in an ink rendered glaze-like by an abundance of binding medium, which penetrates through to the verso.¹² If this was the first chiaroscuro woodcut in which Ugo introduced a third block, as Jan Johnson suggests, it would explain what appears to be an experimental approach to the role of the mid-tone block.¹³

Throughout Ugo's print production, ink is used sparingly, transferring from the blocks cleanly without excess

clogging of the cut away areas. The second state impression of the *Death of Ananias*, printed from three blocks, is typical (Figs. 11.3a–11.3c).¹⁴ His inks often appear translucent, either because the films are thin or the colorants are semi-transparent; they convincingly depict volume when layered. His over printed ink films are usually discrete, not blended, indicating that they were executed wet onto dry. Ugo's chiaroscuro woodcuts reveal minimal to moderate embossment of the sheets, a feature consistent with printing under light to intermediate pressure on slightly damp paper. Low moisture content would have minimised shrinkage and helped to ensure accurate registration, which generally accords with his oeuvre. His inks appear embedded in the paper surface and cover it continuously. All of these qualities suggest that Ugo maintained uniform and optimal wetting of the paper during printing.¹⁵

Ugo's *Diogenes*, which carries Parmigianino's name, is considered to have been created in collaboration with the artist.¹⁶ In early impressions, the printing process achieves a painterly effect. Sheer, translucent ink layers create luminous shadows that promote an illusion of depth. Ugo's ingenuity is on display in the overprinting of hues that mix optically to produce additional, subtly modulated hues. It is not incongruous that such sophisticated colour printing emerged in a work influenced by Parmigianino, a master colourist and painter in oils (Figs. 11.4a–11.4c).

Another hallmark of Ugo's workshop practices is the printing of editions of limited size. For instance, certain early impressions of *Raphael and his Mistress*,¹⁷ and of the second state of *David and Goliath*,¹⁸ appear to have been printed in the same grey palette of inks and may have been issued together. This would imply that the

8 A. von Bartsch, *Le peintre graveur*, 21 vols. (Vienna, J.V. Degen, 1803–1821), vol. 12: Les clair-obscur des maîtres italiens.

9 London, British Museum, 1860,0414.100; Berlin, Kupferstichkabinett, 230–1920.

10 Boston, Museum of Fine Arts, 64.1085. Johnson, 'Ugo da Carpi', 18–86.

11 Such as: Boston, Museum of Fine Arts, 64.1042; P1682; London, British Museum, 1918,1010.34.

12 This is exemplified by Cambridge (Mass.), Fogg Art Museum, M657.

13 Johnson, 'Ugo da Carpi', 48–53. Johnson documents two states of the *Descent from the Cross* (BXII.43.22), but seems to confuse states and variant printings. She also notes 'several different sets of closely similar blocks' of the composition. This author has observed two states. The first state has a blank lower margin. The second state displays the inscription + RAPHAEL. URBINAS+ in the lower margin and the top and right frame of the keyblock is replaced with a thicker frame. Compare Cambridge (Mass.), Fogg Art Museum, M657 (first state) to London, British Museum, 1918,1010.34 (second state). Johnson notes an impression without the second (mid-tone) block; this is a variant printing of the second state.

14 This variant printing of *Death of Ananias* (B.XII.46.27), identified by Takahatake, is missing the second darkest block of this four-block composition. N. Takahatake, 'Ugo da Carpi', review of M. Rossi ed., *Ugo da Carpi, l'opera incisa: xilografie e chiaroscuri da Tiziano, Raffaello e Parmigianino. Print Quarterly* 27 (2010), 320–21.

15 The rare first state of *Venus and Cupids* is a fine example. Boston, Museum of Fine Arts, 64.1090.

16 D. Landau and P. Parshall, *The Renaissance Print, 1470–1550* (New Haven [etc.]: Yale University Press, 1994), 153–54.

17 Oxford, Ashmolean Museum, WA1863.1694; WA1863.1695; WA1863.1696; WA1918.10.

18 Oxford, Ashmolean Museum, WA1863.1690; WA1863.1691. States four and five of *David and Goliath* were presumably printed under the supervision of someone else, in that Ugo's name is excised from the blocks, the blocks are overly inked, the inks are inconsistently applied, and the ink palettes and formulation are atypical. Berlin, Kupferstichkabinett, 5028–1877 (fourth state); 300–73 (fourth state); Madrid, Biblioteca Nacional, 41168 (fifth state, as recorded in Takahatake, 'Niccolò Vicentino's *Miraculous Draught*', 260, n. 24.)



FIGURE 11.3A *Ugo da Carpi, Death of Ananias, c.1518, three-block impression of a chiaroscuro woodcut normally from four blocks, 22.8 cm. × 37 cm. Variant printing lacking the second darkest block. Overall*
WASHINGTON, DC, LIBRARY OF CONGRESS, FP-XVI-C298, NO.1A



FIGURE 11.3B *Photomicrograph, 16.5 mm × 12 mm, normal illumination*



FIGURE 11.3C *Photomicrograph, 16.5 mm × 12 mm, raking illumination*



FIGURE 11.4A *Ugo da Carpi, after Parmigianino, Diogenes, c.1527–30, chiaroscuro woodcut from four blocks, 48.1 × 35.2 cm. Overall*
 BOSTON, MUSEUM OF FINE ARTS, BEQUEST OF W.G. RUSSEL ALLEN, 64.1085;
 PHOTOGRAPH © 2014 MUSEUM OF FINE ARTS, BOSTON



FIGURE 11.4B *Photomicrograph, 34 mm × 25 mm, normal illumination*



FIGURE 11.4C *Photomicrograph, 34 mm × 25 mm, raking illumination*

blocks for both compositions were close in execution, as Johnson suggests, based on the incorporation of a framing device into their design.¹⁹ The technically accomplished *Massacre of the Innocents* was issued in two editions of the print, once in translucent warm grey inks²⁰ and again in slightly opaque, neutral greys that appear translucent due to their thin application.²¹

Ugo was an exacting craftsman who paid close attention to the process, whether he was based in Venice, Rome or elsewhere. The uniform quality of the execution of his early impressions suggests that he likely supervised the printing himself. Indeed, the scope of his managerial capacity is signalled by Ugo's papal privilege of 1518 for his *Death of Ananias* which indicates that he was a cutter and publisher while in Rome.²² Judging by the prints that have come down to us, it can be posited that he produced chiaroscuro woodcuts for a limited, select market.

¹⁹ Johnson, 'Ugo da Carpi', 52.

²⁰ Boston, Museum of Fine Arts, 64.1033; London, British Museum, 1870,1008.1971; Cambridge, Fitzwilliam Museum 34.17–20.

²¹ Berlin, Kupferstichkabinett, 334–1910; Windsor, Royal Library, 850415.

²² Landau and Parshall, *The Renaissance Print*, 150.

Antonio da Trento

According to Vasari, Antonio da Trento executed four woodcuts between 1527–30 while engaged in Bologna by Parmigianino to cut Parmigianino's designs.²³ Two additional compositions, *Lute Player* (B.XII.143.3) and *St John the Baptist in the Desert* (B.XII.73.17), have Antonio's monogram 'AT' in a frame-like perimeter.

With the exception of the three-block *Martyrdom of Saints Peter and Paul*, these chiaroscuro prints comprise one tone block and one key block. The four compositions recorded by Vasari exhibit competent cutting and a controlled printing technique in early impressions. His palettes tend toward browns, blues, greens, ochres and light pink. The inks are matte, often printed in thin, translucent films that exhibit a slight 'squash' or 'channelled squash' and have very finely ground pigments. Antonio's webs of hatching are crisply delineated by well formulated ink, as exemplified by *Man Seen from Behind* (Figs. 11.5a–11.5c). In all of these refinements, his workshop 'signature' is similar to Ugo's. The frequent use of grey for printing the key block yields a muted effect. Commonly, the tonal range is softened by printing light tone blocks over darker key blocks. Ink layers appear blended or merged in some impressions, evidence of printing wet ink onto wet ink. The embedding of the ink films into the paper surface, the evenness of the ink, and the moderate embossment from the blocks indicate that the paper was moderately dampened. Less commonly, compositions such as the *Tiburtine Sibyl* or Antonio's largest print, the *Martyrdom of Saints Peter and Paul*, can reveal slight irregularity in the ink layers probably caused by inconsistent maintenance of dampness or non-uniform inking.

That Ugo's working methods are echoed in many early impressions of Antonio's compositions suggests that Ugo oversaw the printing of woodcuts created in collaboration with Parmigianino.²⁴ For example, there is marked similarity between the ink quality and printing technique of the earliest impressions of the *Martyrdom* and Ugo's *Diogenes*, despite slight differences in palettes. In addressing the *Martyrdom*, we must reckon with Johnson's versions A, B and C of the print.²⁵ She proposed that A and B



FIGURE 11.5A *Antonio da Trento, after Parmigianino, Man Seen from Behind, 1527–30, chiaroscuro woodcut from two blocks, 28.8 × 18.2 cm. Overall*
WASHINGTON, DC, LIBRARY OF CONGRESS, FP-XVIA635, NO.12

are distinguished by the presence or absence of ·F· incised into the lightest tone block and that C has a different key block. However, Johnson's C should be considered the first state. In the only recorded edition (in light grey-brown, medium grey-brown and black), the key block retains passages that are cut away in the second state (Johnson's A/B).²⁶ In each impression from the first-state edition, a diagonal, linear pattern from the paper texture has transferred to the ink film,²⁷ likely indicating that the

23 These are *Martyrdom of Saints Peter and Paul* (B.XII.79.28), *Tiburtine Sibyl* (B.XII.90.7), *Madonna with the Roses* (B.XII.56.12), *Man seen from Behind* (B.XII.148.13). Vasari, *Lives*, 1: 938, 2: 89. Landau and Parshall, *The Renaissance Print*, 155. Landau notes that Vasari's 'word can be believed in this case, since he was in Bologna in 1529 for the preparations of the coronation of Charles V'.

24 For additional evidence of Ugo and Antonio working together, see N. Takahatake, 'Ugo da Carpi's *Diogenes*', this volume, 120–22.

25 J. Johnson, 'States and Versions of a Chiaroscuro Woodcut', *Print Quarterly* 4 (1987), 154–58.

26 To demonstrate that the first and second states are identical in size and design, except for areas intentionally cut, a tracing on transparent polyester film was made of a second-state impression and superimposed over a first-state impression. I thank Kim Schenck, National Gallery of Art, for permitting this experiment to be carried out using Washington, D.C., National Gallery of Art, first state 2006.162.2 and second state 1964.8.1625.

27 See New York, Metropolitan Museum of Art 22.73.3–45; Boston, Museum of Fine Arts, 64.1070; Washington, D.C., National Gallery of Art, 2006.162.2.

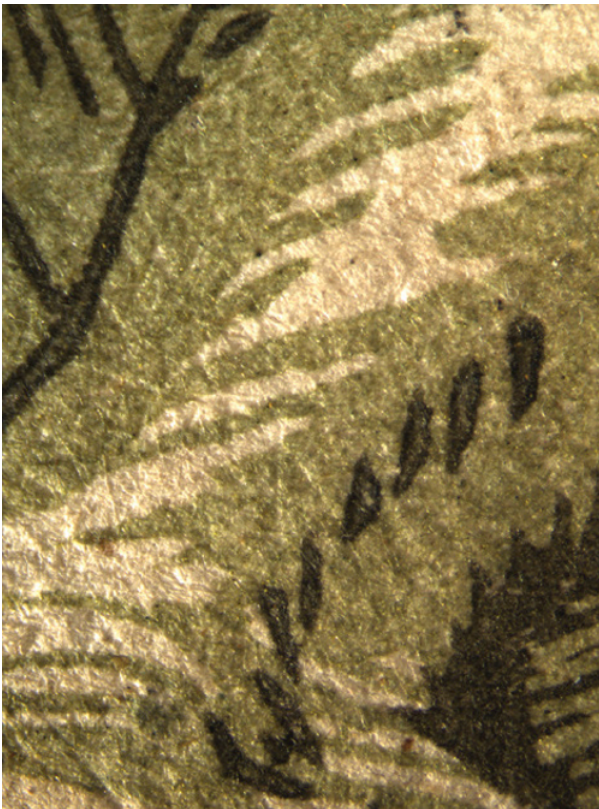


FIGURE 11.5B Photomicrograph, 16.5 mm × 12 mm, normal illumination

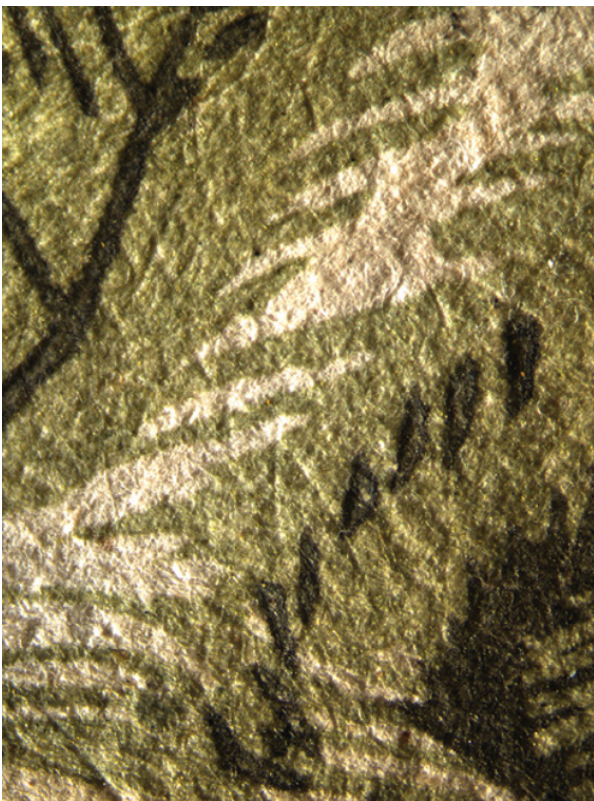


FIGURE 11.5C Photomicrograph, 16.5 mm × 12 mm, raking illumination

sheets were couched on twill-woven felt when originally manufactured. There is only one known edition of the first state, reinforcing the notion that the key block was soon modified.

Johnson's A and B appear to be the second state in which the shallowly carved ·F· does not print consistently. The proof is in three impressions from a single edition in which the ·F· is clearly visible in two²⁸ but filled in with ink in the third.²⁹ (The edition is in translucent red ochre, grey and grey-black inks, but the grey mid-tone block appears brown when printed over the red ochre.) The ·F· 'disappeared' in later editions by being worn down or clogged with ink during printing. The ·F· is partially visible in two printings in the respective palettes of brown, blue, black³⁰ and light tan, light blue, grey-black.³¹

Several impressions of Ugo's third state of *David and Goliath* are executed in palettes akin to early impressions of the second state of the *Martyrdom*. In one pair of these compositions, the palettes may be identical and are printed in the nonconventional order of darkest to lightest (black, medium blue, light blue),³² underscoring the likelihood that a single workshop produced both impressions.³³ Partnering with Ugo may have provided Parmigianino with access to printing equipment and expertise. Because there are comparatively many late impressions that diverge from the precise printing typical of Ugo's and Antonio's rarer early output, it seems that their blocks passed to other printers relatively soon after being cut.

The relationship between Antonio and Parmigianino ended abruptly one morning when, according to Vasari, Antonio absconded with all the artist's plates, blocks and drawings he could find. Although the plates and blocks were recovered, the stolen drawings were dispersed and served as models for other printmakers.³⁴ A.E. Popham's catalogue of

28 Washington, D.C., National Gallery of Art, 1964.8.1625; Cambridge (Mass.), Fogg Art Museum, M9778.

29 Boston, Museum of Fine Arts, M9722.

30 London, Victoria & Albert Museum, 29471.1.

31 Los Angeles County Museum of Art M.2012.137; London, Victoria & Albert Museum, E941.88.

32 *Martyrdom of Saints Peter and Paul*, Amsterdam, Rijksmuseum, 31.276; *David and Goliath*, Frankfurt a.M., Städel Museum 33920. I thank Shelley Langdale, Philadelphia Museum of Art, for information about chiaroscuro prints from the Rijksmuseum and Städel Museum, including these.

33 A fourth state impression of *David and Goliath* (Amsterdam, Rijksmuseum, 31.010) that deviates from Ugo's refined printing, has an offset on the verso of the *Martyrdom* mid-tone—suggesting that the blocks for both compositions passed to the same later publisher. Correspondingly, Ugo's name has been excised from the fourth state of the woodcut.

34 Vasari, *Lives*, 1: 938–39.

Parmigianino drawings includes numerous designs corresponding to Niccolò Vicentino's chiaroscuro woodcuts.³⁵ There is a high probability that Vicentino accessed the drawings through Antonio, who apparently also cut woodcuts from a number of these designs after leaving Parmigianino.³⁶ Some of Antonio's post-Parmigianino output exhibits the attributes of impressions issued by the Vicentino workshop, suggesting that Antonio and Vicentino worked with the same printer for a time.

Giuseppe Niccolò Vicentino

Adam von Bartsch ascribed seven prints to the blockcutter Giuseppe Niccolò Vicentino (also known as Giuseppe Niccolò Rossigliani), after designs of Raphael/Giulio Romano, Maturino, Polidoro, Camillo Boccaccino and Parmigianino (see first seven prints, Table 11.1).³⁷ In Table 11.1, the first five prints are signed by Vicentino, and all but *Hercules Strangling the Nemean Lion* have three or four blocks. A baseline for Vicentino's methods and materials can be established by evaluating his accepted works.

Vicentino's palettes tend to be high-contrast, including browns, greys, olive-greens, vibrant greens, violets, mustard ochres, reds, siennas and salmon. Usually, the pigments are ground so coarsely that the ink films are grainy and particles can be discerned with the unaided eye. His compositions are punctuated by an emphatically printed black or dark-coloured key block characterized by heavy inking, very deep embossment and pronounced 'channelled squash'. The decorative, saturated hues and opacity of his inks flatten pictorial space.

Most inks are printed in stiff, viscous pastes that appear reticulated under low magnification because they were pulled into peaks as the paper was peeled from the block. This signals workshop practice because it holds across different coloured pigments and print compositions.

However, other inks are overly liquid and so poorly formulated that either they feather or the binding medium migrates out from the pigment. For example, in an impression of *The Adoration of the Magi*, the yellowed binding medium has moved laterally from the coarsely ground, blue-grey pigment of the lightest tone block (Figs. 11.6a–11.6c). This indicates excess binding medium, binding medium that is insufficiently polymerised, and/or large pigment particles that desorb the binding medium. The frequent deep embossment of Vicentino's woodcuts demonstrates that the paper was exceptionally damp for printing much of this workshop's output. This contributed to the prevalence of poor registration. Other common qualities include irregular deposition of ink films, brush or wipe marks to re-distribute ink,³⁸ smears, and the inadvertent transfer of ink from the gouged out regions between the raised lines of the block. The shop with which Vicentino was associated had inconsistent and untidy printing practices.

Many of Vicentino's prints have ink offset on the verso, usually from the key block. The prominence of these offsets may reveal not only that impressions were stacked before the ink was dry, but also that the stack of completed prints may have been weighted to flatten the sheets.³⁹ The presence of offsets in Vicentino's production contrasts with the cleanly executed, early impressions by Ugo and Antonio da Trento.⁴⁰ Vicentino's ink layers commonly appear discrete, although in many prints the films are merged, signalling wet onto wet printing. (In Table 11.1, the

35 A.E. Popham, 'Drawings for or Connected with Chiaroscuro Woodcuts', in *Catalogue of the Drawings of Parmigianino* (New Haven [etc.]: Yale University Press, 1971), plates 115–34.

36 According to Bartsch, these are: *Force* (B.XII.129.7), *Truth* (B.XII.130.8), *Pallas* (B.XII.122.23), *The Apostles* (B.XII.69.1; B.XII.70.2–5; B.XII.70.7–8; B.XII.70.10–12), *Cecilia Playing the Harpsichord* (B.XII.85.37).

37 Vasari says Vicentino made woodcuts after Parmigianino's death, 1540. Vasari, *Lives*, 2: 89. Popham interpreted this as indicating that Parmigianino's drawings for these woodcuts were taken from his oversight. A.E. Popham, 'Observations on Parmigianino's Designs for Chiaroscuro Woodcuts', in *Miscellanea I.Q. van Regteren Altena* (Amsterdam: Scheltema & Holkema, 1969), 16, no. v, 48.

38 Chiaroscuro woodcut inks are widely variable in viscosity; evidently some were sufficiently liquid to be manipulated post-printing.

39 Some prints that have all Vicentino's hallmarks bear offsets of other compositions that Bartsch attributes to Antonio da Trento. Two impressions of *Saints Peter and John* (Washington, D.C., Library of Congress XVI-C298.28 and Boston, Museum of Fine Arts, 64.1067) have an offset of the key block for *Diana and the Hounds*. The verso of *Christ Healing the Paralytic* (London, British Museum, 1860.04.1484) has maculatures from both the key block and tone block for *The Choleric Temperament*.

40 Though instances of offset are rare in early impressions, Ugo's *Hercules Chasing Avarice from the Temple* bears an imprint of *Venus and Cupids'* lightest tone block on the verso of eight known examples. In addition to six documented by Johnson, there are impressions held by Los Angeles County Museum of Art M.88.91.363 and London, British Museum, 1895.0122.1239 as recorded by Takahatake. The tone block of *Venus* is printed in the same ink as the tone block of *Hercules*. See Johnson, 'Ugo da Carpi', 86 and Takahatake, 'Ugo da Carpi', 320, n. 14, respectively. Two impressions of Antonio's second state of the *Martyrdom of Saints Peter and Paul* have imprints on the verso from the lightest tone block of these impressions. See Washington, D.C., National Gallery of Art, 1988.65.3.a.b; Berlin, Kupferstichkabinett, AM228-1974.



FIGURE 11.6A *Niccolò Vicentino, The Adoration of the Magi, after 1540, chiaroscuro woodcut from three blocks, 16.7 × 24.1 cm. Overall*
WASHINGTON, DC, LIBRARY OF CONGRESS, FP-XVI-V633.57D

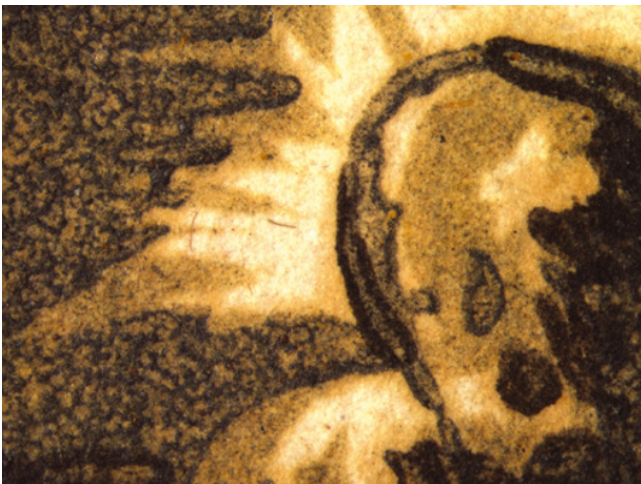


FIGURE 11.6B *Photomicrograph, 12 mm × 16.5 mm, normal illumination*



FIGURE 11.6C *Photomicrograph, 12 mm × 16.5 mm, raking illumination*

'lime, green, black edition' was printed in this manner.) This would require two presses.⁴¹ The emphasis of these printing operations was expedience and high production.

In addition to the core group of seven compositions given to Vicentino, another forty can be assigned to his workshop based on shared physical characteristics (see table). Approximately two-thirds have been alternatively attributed to Ugo or Antonio, but do not correspond to the aforementioned workshop practices of either printmaker. Thus forty-seven compositions were printed in the same workshop, irrespective of blockcutter. Bartsch designated thirteen of these prints to be by anonymous cutters, including *Christ Healing the Paralytic* (Figs. 11.7a–11.7c). The impression illustrated typifies the conspicuous features of Vicentino's production.

The Vicentino workshop issued editions of its large stock of woodblocks in groups comprising numerous compositions. State changes, wear to the blocks and insect damage are clues to the chronology of these multi-woodcut editions, but early impressions confirm that the



FIGURE 11.7A *Niccolò Vicentino, Christ Healing the Paralytic, after 1540, chiaroscuro woodcut from four blocks, 26.7 × 20.1 cm. Overall*
WASHINGTON, DC, LIBRARY OF CONGRESS,
FP-XVI-V633, NO.2

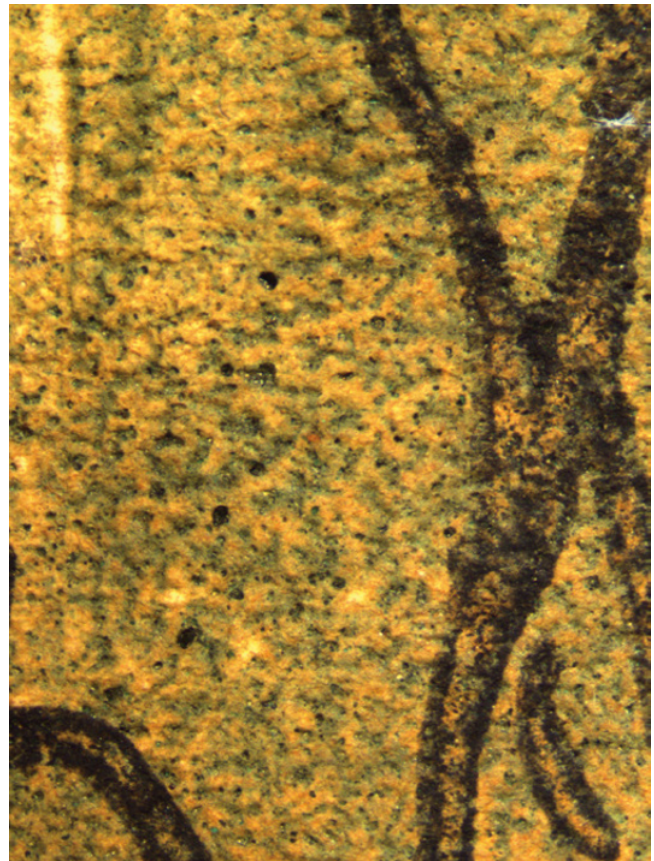


FIGURE 11.7B *Photomicrograph, 16.5 mm × 12 mm, normal illumination*

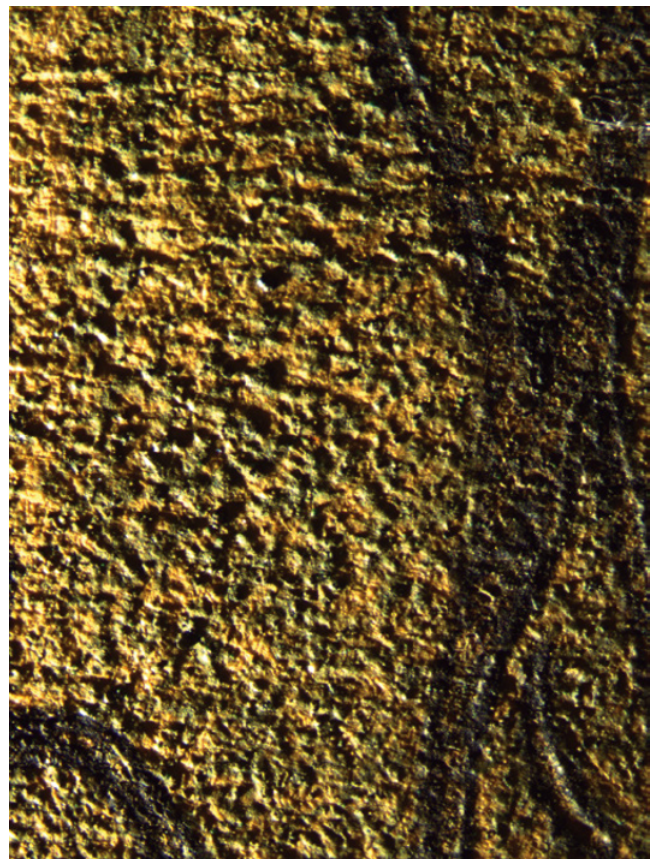


FIGURE 11.7C *Photomicrograph, 16.5 mm × 12 mm, raking illumination*

⁴¹ Most sixteenth-century printing houses had one to three presses. P. Gaskell, *A New Introduction to Bibliography* (Oxford: Oxford University Press, 1972), 175–76.

compositions originated in the Vicentino shop. Fourteen multi-woodcut editions have been identified. (Table 11.1 provides a chronological inventory of six of the fourteen.) Printing multiple compositions in a single timeframe required that the inks be prepared in sizable batches and necessitated large supplies of paper and ample space to dry and store the printed sheets. This implies a commercial enterprise and robust market – more chiaroscuro woodcuts have survived from this venture than any other sixteenth-century source. Initially multi-woodcut editions were issued in tonal palettes, however a shift in workshop aesthetic occurs early in its chronological output, marked by vibrant and contrasting hues. The Vicentino shop also was sufficiently adaptive to publish single impressions, executed in seemingly unique palettes.

As the inventory of chiaroscuro woodblocks expanded, so did the number of compositions featured in the multi-woodcut editions, indicating that Vicentino and possibly other blockcutters sustained a working relationship with the printer/publisher responsible. None of the compositions are signed by or firmly attributed to Ugo da Carpi, so his association with the workshop is unlikely. The production also excludes the four Antonio da Trento compositions recorded by Vasari to have been executed under Parmigianino's supervision, as well as the two with Antonio's monogram 'AT'. The blocks for most of the shop's forty-seven woodcuts passed together into the hands of two subsequent printers, as signalled by impressions showing divergent workshop methods that are pulled from worn, insect damaged, plugged or re-cut blocks.

Transfer of Chiaroscuro Woodcut Blocks

The first workshop to acquire this inventory of blocks was a printer of red Greek liturgical text. The red text appears on the verso of twenty-one compositions thus far recorded to have been published by him,⁴² including the Vicentino-signed Cloelia.⁴³ They were executed on waste

sheets imprinted with the same passages of a Greek Psalter in octavo. On the rectos, the woodcuts were printed in different combinations of four inks: yellow ochre, brown, black and red. The red ink is visually identical to that of the Greek text and appears in the first tone block of *The Apostle Saint John*⁴⁴ and in the *à la poupée* inking of a mid-tone block of *The Presentation in the Temple*.⁴⁵ Thus, these woodcuts were probably executed in the workshop where the Greek text was printed, and on reused waste sheets.⁴⁶ The printer likely was established in Venice, as the type appears to have been made in 1548 by Guillaume I Le Bé for Christopher Zanetti, a Venetian publisher.⁴⁷ The type remained with the Zanetti family business for three generations until the turn of the century when it was acquired by the Venetian publisher Antonio Pinelli. This provides a *terminus ante quem* for the cutting of the twenty-one woodcuts. In the sixteenth century, books were often printed in red and then black.⁴⁸ The same skills are required to register colours of text and chiaroscuro woodblocks, but this printer seems to have been careless; the chiaroscuro prints are marred by mis-registration, ink smears, ink-clogged blocks, and thick, opaque ink films.

they were printed after Vicentino issued them. J. Johnson, 'Greek Texts on Chiaroscuro Woodcuts', *Print Quarterly* 29.4 (2012), 417–8.

44 Berlin, Kupferstichkabinett, 173–1891.

45 Oxford, Ashmolean Museum, WA1863.3927; WA1863.3931; Braunschweig, Herzog Anton Ulrich-Museum, AB 2.2.

46 Paper was a valuable and often re-purposed commodity. The red text is printed acceptably for publishing, but because every known sheet has the same Greek passage, it seems that more were pulled than were needed.

47 E. Layton, *The Sixteenth Century Greek Book in Italy: Printers and Publishers for the Greek World* (Venice: Istituto ellenico di studi bizantini e postbizantini di Venezia, 1994), 32–8 and fig. 36. According to Layton, there is a second type that is very similar to the Le Bé type stylistically. It was cut by Andrea Spinelli. It passed to Zuan Battista Tauroceni who was active 1580–1584; then to Giovanni Ali. It last appeared in imprints of Domenico de Poloni. The Le Bé type is slightly smaller than the Spinelli (Le Bé 20 lines = 112–13 mm; Spinelli 20 lines = 114–15 mm). Based on the size of the red Greek type on the verso of *The Holy Family with St Margaret and a Bishop* (Washington, D.C., Library of Congress, XVI-V633.37), it is the smaller Le Bé that appears on the waste paper. There are only two lines of type to measure on the verso of the Library of Congress print, yielding the following results: 2 lines = 11 mm (with diacritical mark); 2 lines = 10 mm (without diacritical mark); 2 lines = 11 mm (with lower diacritical and Capitol E). Multiplying by 10 to calculate a 20 line equivalent: 10 × 11 = 111 mm. This analysis indicates that the type is attributable to Le Bé, not Spinelli. I thank Daniel DeSimone, Folger Shakespeare Library, and Nicolas Barker, editor of *The Book Collector*, for guiding me in this research.

48 Gaskell, *New Introduction*, 137–38 and n. 49.

42 I thank Naoko Takahatake, Los Angeles County Museum of Art, for bringing to my attention impressions in Paris, Bibliothèque Nationale de France, and New York, Metropolitan Museum of Art.

43 Takahatake, 'Niccolò Vicentino's *Miraculous Draught*', 260. In addition to the impression documented by Takahatake (New Haven, Yale University Gallery of Art, c1964.9.13a), there is a second, held by the Munich, Staatliche Graphische Sammlung, 6183. Johnson mistook the repurposed waste sheets from a Greek Psalter with the by-product of a press balancing and proofing procedure. Many of the 21 woodcuts produced by 'the printer of red Greek type' exhibit damage to the blocks which reveals that

TABLE 11.1 *Publication Chronology of Woodcuts from the Vicentino Workshop*

Key:

ASH Ashmolean Museum

BERLIN Kupferstichkabinett

BNF Bibliothèque Nationale de France

BM British Museum

ETH Swiss Federal Institute of Technology Zurich

FITZ Fitzwilliam Museum

FOGG Fogg Museum, Harvard University

HAUM Herzog Anton Ulrich-Museum

LC Library of Congress

Title & Bartsch #	Vicentino		
	Beige-Greys (Darkened Lead White) ⁴⁹	Olive Greens, Brown-Umber	Verdigris Greens, Black ⁵⁰
<i>HERCULES STRANGLING THE NEMIAN LION</i> XII.119.17 I			
<i>CLOELIA</i> XII.96.5 I	state i (v&A 19486)	state i (MFA 64.1083(i))	
<i>AJAX</i> XII.99.9 I		state i (BM 1860, 4-14-107)	
<i>CHRIST HEALING THE LEPERS</i> XII.39.15 I	state i (BRSG V5904#67)		state i (PMA 1985-52-42)
<i>THE VIRGIN SURROUNDED BY SAINTS</i> XII.64.23			(FOGG M9920)
<i>THE ADORATION OF THE MAGI</i> [LARGE] XII.30.3	state i (BM 1859, 07-09-2358)		state ii (BM 1941, 12-13-533) (FITZ 34.17-40) (v&A E.1787-1889) (MET 22.73.3-156)
<i>THE ADORATION OF THE MAGI</i> [SMALL] XII.29.2 I			
<i>SATURN</i> XII.125.27 I			state i (ETH D323)
<i>THE VIRGIN AND CHILD, ST. SEBASTIAN AND BISHOP SAINT</i> XII.66.26 I			state i (BM 1858, 04-17-1575)
<i>THE RESURRECTION OF CHRIST</i> XII.45.26			
<i>THE PRESENTATION IN THE TEMPLE</i> XII.31.6 I	state i (BM 1859, 07-09-2359)	state ii (BERLIN 902-301)	
<i>ALLEGORY OF SURPRISE</i> XII.146.10		state i (FOGG G7487)	
<i>MIRACULOUS DRAUGHT OF FISHES</i> XII.37.13 II			state i (BERLIN 303-38)

49 For the identification of white lead, see: L. Stiber Morenus, C. Eng, N. Takahatake and D. Rambaldi, 'Sixteenth- and Seventeenth-Century Italian Chiaroscuro Woodcuts: Instrumental Analysis,

Degradation and Conservation', *Journal of the American Institute for Conservation*, forthcoming.
 50 For the identification of verdigris: *Ibid.*

LOUVRE Musée du Louvre
 NGA National Gallery of Art
 MET Metropolitan Museum of Art
 MFA Museum of Fine Arts Boston
 MUNICH Staatliche Graphische Sammlung
 PMA Philadelphia Museum of Art

RIJKS Rijksmuseum Amsterdam
 STÄDEL Städel Museum
 v&A Victoria & Albert Museum
 WES Wesleyan University
 YALE Yale Gallery of Art
 WINDSOR Windsor Castle

			Printer of Red Greek Type re-issue	Andreani re-issue
Mustard Ochre, Sienna, Black	Lime, Green, Black	Red, Brown, Black		
state i (v&A 26174) (MET 22.67.75)				state ii (PMA 1985-52-172)
			state i (YALE c1964.9.13a) (MUNICH 6183)	state ii (PMA 1985-52-317)
state i (FITZ 31K.9-158)	state i (WINDSOR 830795)			state ii (PMA 1985-52-308)
state i (MFA 64.1040 i) (BM W.4-52) (FOGG G7490) (WES 1940.D1.194) (v&A 29471.2) (MUNICH 12179)	state i (BNF EA26 Boite6(1)) (v&A E288-90)			state ii (PMA 1985-52-2186)
(MFA 64.1047) (BM 1941,12-13-538) (PMA 1985-52-2080) (exception with olive-brown mid-tone: MUNICH 12129)				
state ii (MFA 64.1029) (BERLIN 456-38)				
state i (LC XVI-V633,57b) (v&A 15279)				state ii (PMA 1985-52-2127)
state i (MUNICH 25130 D)	state i (BM 1860, 04-14-113)	state ii (PMA 1985-52-169) (MFA 64.1111)		state iii (BERLIN 306-38)
	state i (BM 1928, 03-13-50)		state i (MFA P1683)	state ii (BERLIN 305-38)
	(BM 1928, 03-13.49)			
	state ii (NGA 1972.65.14) (BM 1858, 04-17-1573)		state ii (ASH WA1863.3927) (ASH WA1863.3931) (HAUM AB 2.2)	state iii (BERLIN 952-301)
	state ii (BM 1874, 08-08-207)	state iii (BM 1860, 04-14-117) (BERLIN 580-1895)		state iv (PMA 1985-52-2078); state v (BERLIN W-21) (RIJKS 31.093)
	state i (LOUVRE 4386) (BERLIN 979-64)		state i (MET 1922,22.67.39) (MUNICH 4162)	state ii (LC XVI-C298,55); state iii (PMA 1985-52-2133)

TABLE 11.1 *Publication Chronology of Woodcuts from Vicentino Workshop (cont.)*

Title & Bartsch #	Vicentino		
	Beige-Greys (Darkened Lead White)	Olive Greens, Brown-Umber	Verdigris Greens, Black
<i>STS PETER AND JOHN</i> XII.77.26 I		state i (FITZ 22.I.5-185) (RIJKS 31.042)	
<i>ST PETER PREACHING TO THE MULTITUDE</i> XII.77.25 II			
<i>NYMPHS BATHING IN STREAM</i> XII.122.22 II		state i (PMA 1985-52-10)	
<i>PEOPLE RENDERING HOMAGE TO PSYCHE</i> XII.125.26 I		state i (BERLIN 986-19)	
<i>THE CHRISTIAN VIRTUES-TEMPERANCE</i> XII.129.5 I	state i (LC XVI-V633-8)		
<i>THE CHRISTIAN VIRTUES-PRUDENCE</i> [TO LEFT] XII.129.6		(BM 1884,07-26-20)	
<i>PRUDENCE</i> [TO RIGHT] NOT IN BARTSCH			
<i>THE CHRISTIAN VIRTUES-CHARITY</i> XII.128.3		(BM 1884,07-26-18)	
<i>THE CHRISTIAN VIRTUES-FAITH</i> XII.128.1		(BM 1884,07-26-16)	
<i>THE CHRISTIAN VIRTUES-HOPE</i> XII.128.2			
<i>THE CHRISTIAN VIRTUES-FORTITUDE</i> XII.129.4			
<i>FORTITUDE</i> XII.129.7	(BM 1874,08-8-1366)		
<i>TRUTH</i> XII.130.8			
<i>PAN</i> XII.123.24 [1] II			
<i>DISPUTE OF MARSYAS</i> XII.123.24 [2] II			
<i>CECILIA PLAYING THE HARPSICHORD</i> XII.85.37			
<i>CIRCE DRINKING FROM A CUP WITH ULYSSES</i> XII.111.8 I			
<i>CIRCE DRINKING FROM A CUP WITH ULYSSES</i> XII.111.7			
<i>CIRCE GIVING DRINK FROM CUP</i> XII.110.6 I			
<i>HOLY FAMILY WITH ST MARGARET AND BISHOP</i> XII.64.24 I			

			Printer of Red Greek Type re-issue	Andreani re-issue
Mustard Ochre, Sienna, Black	Lime, Green, Black	Red, Brown, Black		
	state i (LC XVI-C298, 28) (MFA 64.1067)			state ii (PMA 1985-52-2129)
			state i (BNF Reserve EA26 boîte, Gayral 5,1,a)	state ii (PMA 1985-52-2191)
	state i (FOGG M9811) (MFA 64.1105)		state i (RIJKS 31.059)	state ii (PMA 1985-52-2087)
state i (BM 1904, 02-26-16) (exception with olive-brown mid-tone: v&a E.946-'88)	state i (BNF EA26 Boite6(2)) (MFA 64.1109)		state i (RIJKS 31.068)	state ii (BM 1859,07-09-2378)
			state i (MFA 64.1122)	state ii (LC XVI- V633,64)
	(BERLIN 176-1891)			(PMA 1985-52-190)
	(MFA 64.1118)		(BNF Bd-5(A) fol138)	(LC XVI-V633,23)
			(MFA 64.1120)	(LC XVI-C298,31)
(PMA 1985-52- 2106)			(RIJKS 31.079)	(MUNICH 12147)
				(LC XVI-C298,33)
			(BNF Bd-5(A) fol57)	(PMA 1985-52- 20874)
			(STÄDEL 46244) (MET 49.95.2)	(RIJKS 31.062)
				state ii (PMA 1985-52-1689)
	state i (MFA P1691) (YALE C1975.19)			state ii (RIJKS 31.133)
				state ii (PMA 1985- 52-187)
				(RIJKS 31.128)
			state i (LC XVI-V633,37)	state ii (PMA 1985-52-173)

TABLE 11.1 *Publication Chronology of Woodcuts from Vicentino Workshop (cont.)*

Title & Bartsch #	Vicentino		
	Beige-Greys (Darkened Lead White)	Olive Greens, Brown-Umber	Verdigris Greens, Black
<i>CARDINAL AND THE DOCTOR</i> XII.144.6			
<i>PALLAS ATHENA</i> XII.122.23			
<i>CHRIST HEALING THE PARALYTIC</i> XII.38.14			(MFA 64.1039) (LC XVI-V-633,2) (BM 1941,12-13-535)
<i>THE DREAM OF JOCOB</i> XII.25.5			(BM 1941,12-13-532)
<i>THE APOSTLES – ST PETER</i> XII.69.1; <i>ST ANDREW</i> XII.70.2; <i>ST JAMES THE GREAT</i> XII.70.3; <i>ST JOHN</i> XII.70.4; <i>ST PHILLIP</i> XII.70.5; <i>ST MATTHEW</i> XII.70.7; <i>ST THOMAS</i> XII.70.8; <i>ST SIMON</i> XII.70.10; <i>ST JUDAS THADDEUS</i> XII.70.11; <i>ST PAUL</i> XII.70.12		The Apostles – St Simon (NGA 1978.30.2); St Thomas (BERLIN 983-19); St John (FOGG M9777)	The Apostles – St Peter (BM 1895-0122-1280); St Andrew (BM 1895-0122-1281) St Judas Thaddeus (BM W-4-59); St James the Great (BM W-4-62) (BM 1895-0122-1282)

Andrea Andreani then acquired the blocks and re-issued thirty recorded compositions originating in the Vicentino shop, including all twenty-one previously controlled by the printer of the red Greek type. The evolved deterioration of the blocks of these twenty-one woodcuts testifies to their publishing history. Andreani signed most of the re-issued prints in the form of a stamp or plug (1602–1610) or an incised double 'A'. (See Table 11.1 for compositions re-issued by the printer of red Greek type and Andreani.)

Conclusion

Analyzing chiaroscuro woodcuts as material objects improves the clarity with which the art form can be

understood.⁵¹ This methodology provides an additional tool for discerning attributions based on the characteristics imparted by the printing process and workshop of origin. Correspondingly, the relation between technique and style is revealed through the evidence resident in each woodcut impression. This approach augments more traditional modes of studying prints, such as commercial and art historical contexts, the design source, and production of the matrices, resulting in a more holistic consideration.

⁵¹ See B. Price *et al.*, 'A Technical Study', this volume, 140–50.

			Printer of Red Greek Type re-issue	Andreani re-issue
Mustard Ochre, Sienna, Black	Lime, Green, Black	Red, Brown, Black		
			(BM 1918,07-13-16) (RIJKS 31.091) (BNF Reserve EA26 boite, Gayral8 epreuve b)	
			(MET 1922,22.67.79)	(LC XVI-A635,39)

(FITZ 34.17-18)				
The Apostles – St. Peter (BERLIN 988-19)	The Apostles – St. Judas Thaddeus (MFA 64.1062)	The Apostles – St. Phillip (PMA 1985-52-2102) St. Judas Thaddeus (BNF BD5 Mazzuoli77)	The Apostles – St John (BERLIN 173-1891); St Andrew (RIJKS 31.222); St Judas Thaddeus (RIJKS 31.220); St Matthew (RIJKS 31.221); St Peter (RIJKS 31.219)	The Apostles – St. John (PMA 1985-52-188); St Simon (MFA 64.1059)

A Technical Study of Sixteenth-Century Italian Chiaroscuro Woodcuts

Beth A. Price, Nancy Ash, Haddon A. Dine, Shelley R. Langdale, Ken Sutherland, Lucia Burgio and Jo-Fan Huang

In his classic 1935 volume, *History of Woodcut*, Arthur Hind concluded that the ‘hand-colouring’ of fifteenth-century woodcuts had not been studied as much as it deserved and that ‘a systematic record of the various colours... would probably be of considerable value to localise isolated cuts.’¹ His commentary would apply throughout the remainder of the twentieth century. Hind himself provided only a brief summary of regional characteristics and a table of colours and pigments in use during the fifteenth century, the latter based on Arthur Laurie’s research in the 1910s.² It was not until the early 2000s that technical studies of hand-coloured prints emerged.³ In contrast, for sixteenth-century woodcuts a systematic record of colour printing inks still is lacking. Little direct scientific data have been reported on early modern colour printing inks and their constituents. Descriptions have been inferred largely from fifteenth century historical treatises and recipes⁴ and from object-based studies of paintings,

illuminated manuscripts, block-printed cloth, texts,⁵ engravings and hand-coloured prints. While these sources provide valuable insights into materials and practices, they do not directly address woodcut colour printing inks.

The only known contemporary reference to early modern colour printing ink for woodcuts is Giorgio Vasari’s brief mention of the artist Ugo da Carpi’s use of ‘oil colour’ in the technical introduction to his *Lives of the Artists*,⁶ but no further details regarding the ink composition are given. Other writers discuss most colourants in the context of paints and varnishes (coatings). The known contemporary recipes for printing inks are mainly for black; an exception is a purchase list of materials from the Florentine Ripoli Press, dated 1481, including two red colourants (*cinabro* and *lacca*) possibly for ink making.⁷ Scholars attempting to understand the materials used in the colour printing inks may be hesitant to rely on these texts without scientific evidence to corroborate analogies to paints and varnishes.

This gap in research has restricted the understanding of sixteenth-century Italian chiaroscuro woodcuts, the most familiar category of colour print in early modern Europe. The first long-term, systematic scientific study of a large group of these woodcuts was initiated by the Philadelphia Museum of Art (PMA) in 2009.⁸ The objectives were to

1 A.M. Hind, *An Introduction to a History of Woodcut with a Detailed Survey of Work Done in the Fifteenth Century*, 2 vols. (Boston and New York: Houghton Mifflin Company, 1935), 167–70.

2 A.P. Laurie, *The Materials of the Painter’s Craft in Europe and Egypt, from Earliest Times to the End of the XVIIth Century, with Some Account of Their Preparation and Use* (London: T.N. Foulis, 1910); A.P. Laurie, *Pigments and Mediums of the Old Masters with a Special Chapter on Microphotographic Study of Brushwork* ([S.l.]: Macmillan, 1914).

3 See T. Primeau, ‘The Materials and Technology of Renaissance and Baroque Hand-Colored Prints’, in S. Dackerman, *Painted Prints: The Revelation of Color in Northern Renaissance & Baroque Engravings, Etchings & Woodcuts* (Baltimore: The Baltimore Museum of Art; University Park, PA: Pennsylvania State University Press, 2002), 49–75, 271–78; S. Fletcher, L. Glinsman and D. Oltrogge, ‘The Pigments on Hand-Colored Fifteenth-Century Relief Prints from the Collections of the National Gallery of Art and the Germanisches Nationalmuseum’, in P.W. Parshall and R. Schoch, *The Woodcut in Fifteenth-century Europe*, exh. cat. (Washington, D.C.: National Gallery of Art, 2009), 277–96; and D. Oltrogge, ‘Illuminating the Print: The Use of Color in Fifteenth-Century Prints and Book Illumination’, in *Ibid.*, 299–315.

4 The earliest known Western ‘printing’ ink recipe (c. 1400) pertains to block-printing (stamping) on cloth. See C. Cennini, ‘Capitolo CLXXIII Il Modo Di Lavorare Colla Forma Dipinti in Panno’, in G.E. Carlo Milanese, *Il libro dell’arte, o Trattato della pittura di Cennino Cennini da Colle di Valdelsa*, ed. C. Milanese, G. Milanese (Firenze: Le Monnier, 1859), 126–28. For Northern treatises, see Johannes De

Ketham’s recipe for ‘Cloth Printing Ink, Late fifteenth century, Flanders’, London, British Museum, Sloane MS 345, in C.H. Bloy, *A History of Printing Ink, Balls and Rollers, 1440–1850* (London: Adams & Mackay, 1967), 100–01, no. 6. Bloy quoted from C.L. Eastlake, *Materials for a History of Oil Painting*, 2 vols. (London: Longman, Brown, Green, and Longmans, 1847, 1869), 1: 285–86. For fifteenth-century printing ink recipes, see D. Oltrogge, ‘Colour Stamping’, this volume, 51–64.

5 For the scientific analysis of red typographic ink in the Doheny Gutenberg Bible, see R.N. Schwab et al., ‘New Evidence on the Printing of the Gutenberg Bible: The Inks in the Doheny Copy’, *The Papers of the Bibliographical Society of America*, 79 (1985), 375–410, esp. 389. The ink was found to be ‘rich in mercury,’ supporting data are not presented.

6 *è imbrattata di colore ad olio*, in G. Vasari, *Le vite de’ più eccellenti pittori, scultori, e architettori*, 2nd ed. (Florence: Giunti, 1568), 66.

7 See P.V. Fineschi, *Notizie storiche sopra la Stamperia di Ripoli* (Florence: Moücke, 1781), 49. Here, *lacca* is interpreted as the material utilised for red dye/lake pigment.

8 The Museum of Fine Arts, Boston, and Victoria and Albert Museum (V&A) became collaborators in 2011.

identify the types of colour inks and their constituents, develop a protocol to describe their colours and palettes, and document the papers' watermarks. This paper describes selected results from a group of thirty-nine woodcuts that have been analysed to date, namely works by the artists Ugo da Carpi and Giuseppe Niccolò Vicentino. Additional findings will be published at the conclusion of the study. The goal is to provide scientific data to promote scholarly discussion about the material nature of the impressions, their original appearance and alterations in colours, and, possibly by extension, their authenticity, attribution and chronology.

Background on Chiaroscuro Woodcut Prints and Printing Inks

Chiaroscuro woodcuts generally are printed in black and/or colour inks from two or more blocks. The colour or tone block(s) provide the overall background and/or middle tone for the image, whereas the unprinted areas of white paper serve as highlights, in the style of tonal drawings executed with wash and/or on tinted paper.⁹ Italian practitioners employed two main approaches, which are distinguished by the interrelationships of the woodblocks. In one approach, a 'key' block carries the primary linear image design, which would be legible if printed on its own. A second block provides broad midtone areas with portions carved away to create the unprinted highlights.¹⁰ In the other approach, interdependent designs are carved into two or more blocks such that no single block would be legible if printed independently – all are essential to form a coherent image. Here, the block for the darkest ink, often referred to as the 'key' block (in this essay called 'darkest/key' block), may carry crucial linear elements of the design but would not produce a legible image if printed by itself. The colours in chiaroscuro woodcuts typically are related closely to articulate a range of tonal values from *chiaro* (light) to *scuri* (shadow), defining forms and describing volume.

Woodcuts were printed from multiple blocks in multiple colours in Europe from the 1480s,¹¹ but the application of the term 'chiaroscuro' to woodcuts is first attested by Ugo da Carpi in 1516, when he petitioned for a privilege laying claim to the creation of a 'new way of printing in

light and dark [*chiaro et scuro*], something new and never before done, a beautiful innovation' that would appeal to lovers of drawing (Introduction, Fig. 1, p. 6).¹² Credited with this invention by Giorgio Vasari,¹³ Ugo often is cited as the first Italian printmaker to create chiaroscuro woodcuts inspired by the tonal range achieved in the wash drawings known as 'chiaroscuro'. However, a two-block example attributed to Lucantonio degli Uberti was printed in Venice in 1516, and the primacy of Ugo's prints in the origination of single-sheet colour woodcuts in Italy cannot be certain.¹⁴ Ugo was nonetheless instrumental in developing the integrated block technique and expanding approaches to the use of colour.¹⁵

Printing inks, such as those that would have been used for woodcuts and typography, have two main constituents: colourant and vehicle (binding medium), called 'varnish' in the early vernacular. The colourant particles were dispersed or dissolved in the vehicle to bind them to a substrate. Historical recipes refer to vehicles made from vegetable oils, usually linseed and less often nut oils.¹⁶ The oils were prepared by heating, boiling

12 '...et havendo io trovato modo nuovo di stampare chiaro et scuro, cosa nuova et mai più non fatta, et é cosa bella, et utile a molti che hanno piacer di disegno...' see M. Gualandi, *Di Ugo da Carpi e dei conti da Panico: Memorie e note* (Bologna: Società Tip. Bolognese E Ditta Sassi, 1854), 22. English translation from L. Pon, *Raphael, Dürer, and Marcantonio Raimondi: Copying and the Italian Renaissance Print*. (New Haven: Yale University Press, 2004), 75. Original in Archivio di Sato di Venezia, Notatorio del Collegio Reg 18, 1515–1520, c38v. See also facsimile in Servolini, *La xilografia* (A. Mondadori: Milan, 1950), 153.

13 G. Vasari, *Vite*, 1,1: 65–66.

14 The signed and dated Uberti print (London, British Museum, 1852,0612.105) is a reverse copy of Hans Baldung (Grien)'s *Preparation for the Witches' Sabbath*, first printed in Strasbourg in 1510 [see London, British Museum, 1834,0712.73 (Bartsch 55)]. With thanks to Elizabeth Savage for this reference. For discussion of the Northern European origins of the use of multiple blocks to create color and tonal woodcuts, see D. Landau and P. Parshall, *The Renaissance Print, 1470–1550* (New Haven, London: Yale, 1994), 184–202; A. Grebe, 'Dürer in Chiaroscuro', this volume, 171–79; A. Klein, 'Hans Wechtlin', this volume, 103–15; E. Savage, 'A Printer's Art', this volume, 93–103.

15 See L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 123–39 and Tahakatake, 'Ugo da Carpi's *Diogenes*', this volume, 116–22 for Ugo (and Vicentino) workshop practices and techniques.

16 For fifteenth-century references to linseed oil for printing, see: M. Conway, 'Appendix vi: The Composition of Ink at the San Jacopo Di Ripoli Press', in *The Diario of the Printing Press of San Jacopo Di Ripoli: 1476–1484: Commentary and Transcription* (Florence: Olschki, 1999), 333–35; and Cennini, 128 and for nut oil, see De Ketham, 285–86. For a vendor inventory dated 1594, see R. Krischel, 'The Inventory of the Venetian "Vendecolori" Jacopo de Benedetti: The Non-Pigment Materials', in *Trade in*

9 For the earliest extensive description of the chiaroscuro woodcut technique, see J.M. Papillon, *Traité historique et pratique de la gravure en bois*, 2 vols. (Paris: Simon, 1766), 2: 149–55.

10 On colour relief printing approaches (1476–1600), see E. Savage, 'Colour Printing in Relief', this volume, 23–24.

11 See E. Savage, 'A Printer's Art', this volume, 93–103.

or burning, with or without driers, to increase the ink's viscosity and shorten its drying time.¹⁷ The selection and use of driers probably was influenced by the colourants, e.g., lead white is a natural drier (siccative), whereas carbon black hinders drying. Resins were added to modify viscosity, impart a gloss or sheen,¹⁸ and/or lower production costs.¹⁹ For woodcuts printed from multiple blocks, ink viscosity and drying time would have been important considerations for the production and appearance of the prints.

Analysis of the Printing Ink Vehicles (Binding Media) and Colourants

A characteristic of Italian chiaroscuro woodcut ink films is their irregular topography, which made discreet microsampling for analysis feasible in thick areas of the ink. Identification of the ink vehicles and colourants was achieved by selective use of Fourier transform infrared microspectroscopy (MFTIR), polarised light microscopy (PLM), Raman spectroscopy, scanning electron microscopy with energy dispersive spectroscopy (SEM-EDS), pyrolysis gas chromatography mass spectrometry with thermally assisted hydrolysis and methylation (THM-Py-GCMS), and X-ray fluorescence spectroscopy (XRF).²⁰

When only elemental analysis by XRF was possible, pigments were inferred on the basis of the detected elements. Taken together, the acquired data reveal much about the inks.

Of the thirty-nine impressions investigated, twenty-seven from the PMA (eighteen printed from Ugo's blocks and nine from Vicentino's) were analysed by MFTIR and THM-Py-GCMS to determine the ink vehicles.²¹ All but one produced data consistent with linseed oil-based vehicles containing conifer resin (from the Pinaceae family) for both colour and black inks; see Fig. 12.1a for an illustrative GCMS chromatogram in which the peaks on the left represent the drying oil components (fatty acids) and the peaks on the right, the resin components (diterpenoids). The ratios of the peaks for azelaic (A), palmitic (P), and stearic (S) acid methyl esters are characteristic of linseed drying oil.²² Three of the most intense peaks represent compounds found in aged, oxidised conifer resins: dehydroabietic, 7-oxo-dehydroabietic and 15-hydroxy-7-oxo-dehydroabietic acids.²³ These new findings of linseed oil/conifer resin-containing vehicles for *coloured* early modern printing inks are consistent with early recipes for *black* printing inks mentioning linseed oil vehicles with colophony/rosin and turpentine (both conifer sourced)²⁴ and substantiate Vasari's account of Ugo's use of 'oil colour' for woodcuts.

Artists' Materials: Markets and Commerce in Europe to 1700, ed. J. Kirby, S. Nash and J. Cannon (London: Archetype, 2010), 264. For related discussion, see also D. Oltrogge, 'Colour Stamping', this volume, 51–64.

17 Here 'boiling' refers to the escape of volatile decomposition products from the oil; see J.S. Mills and R. White, *The Organic Chemistry of Museum Objects* (Oxford: Butterworth-Heinemann, 1994), 43.

18 See A. Manick, 'A Note on Printing Inks', in S. Welsh Reed and R.W. Wallace, *Italian Etchers of the Renaissance & Baroque*, exh. cat. (Boston: Museum of Fine Arts, Cleveland: Cleveland Museum of Art and Washington: National Gallery of Art, 1989), xlv–lvii; A. Stijnman, 'Oil-based Printing Ink on Paper: Bleeding, Browning, Blanching and Peroxides', *PapierRestauration: iada Yearbook* 1 (2000): 61–68; Ibid., *Engraving and Etching: A History of the Development of Manual Intaglio Printmaking Processes* (London: Archetype; Houten: Hes & De Graaf, 2012), 267–86.

19 Printer Joseph Moxon wrote of this practice, 'our *Inck-makers* to save charges mingle many times...a great deal of *Rosin*'. J. Moxon, *Mechanick Exercises: Or, the Doctrine of Handy-works. Applied to the Art of Printing*, 2 vols. (London: Moxon, 1677, 1683), 2: 76–77.

20 For MFTIR, THM-Py-GCMS, and SEM-EDS sample preparation and instrument conditions, see K. Sutherland and B.A. Price, 'Appendix: Scientific Study of Selected Works from the Bonovitz Collection', in A. Percy and C. Zimmerman *'Great and Mighty Things': Outsider Art from the Jill and Sheldon Bonovitz Collection* (Philadelphia: Philadelphia Museum of Art, 2013), 263–65, nt. 1. Also employed: for XRF, a Bruker ARTAX XRF spectrometer and software

(molybdenum source, 50 kV, 600 μ A, livetime 100s, \approx 200 μ m spot size); for Raman, a Bruker Senterra microscope (785 and 532 nm diode lasers, in-situ or ex-situ on glass slide or carbon tape) and OPUS software or a Horiba Jobin Yvon XploRA microscope (638 and 532 nm diode lasers, power at sample between 0.1 and 1 mW) and LabSpec software; and for PLM, a Nikon Eclipse E600 Pol polarised light microscope (Chelsea filter when appropriate) equipped with a Nikon Digital Sight DS-5M camera and EclipseNet software [samples mounted on glass slides with Cargille Meltmount™ ($n = 1.66$)]. Further details are on file at the PMA and V&A.

21 The impressions analysed (including Ugo's *David Slaying Goliath*, *Descent from the Cross*, and *Death of Ananias*) were printed at different points in the lives of the blocks. The complete list of the works studied is on file at the PMA.

22 The palmitic to stearic acid (P/S) ratios (calculated based on peak areas) ranged from 1.0 to 2.0 for samples designated as linseed oil. For discussion of P/S ratios, see J.S. Mills and R. White, *The Organic Chemistry of Museum Objects* (Oxford: Butterworth-Heinemann, 1994), 171–72.

23 Sample mass spectra were compared with reference spectra in K.J. van den Berg, 'Analysis of Diterpenoid Resins and Polymers in Paint Media and Varnishes: With an Atlas of Mass Spectra', in *MOLART Report 10* (Amsterdam: FOM Institute AMOLF, 2003), A4–A9, spectra 3, 5, 7–9 and 12–13.

24 See Conway, *Diario*, 333–35.

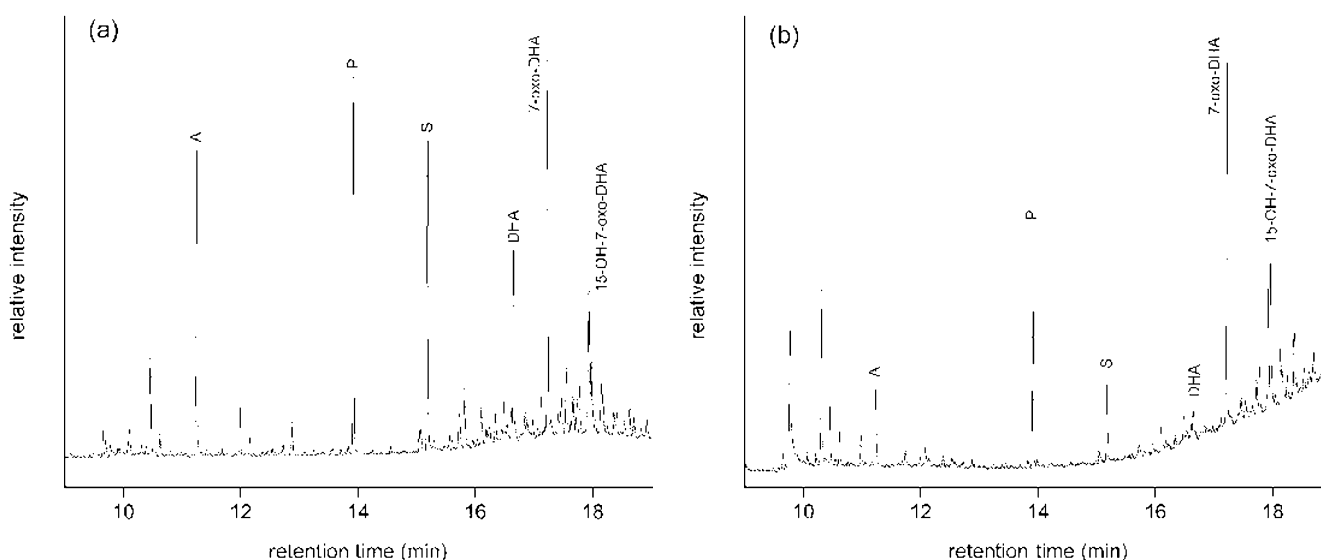


FIGURE 12.1 THM-Py-GCMS total ion chromatograms for samples of printing ink from mid-tone block areas in Ugo da Carpi's (12.1a) Diogenes, after Parmigianino, c.1527–30, and (12.1b) Hercules Chasing Avarice, after Baldesare Peruzzi, c.1516, both PHILADELPHIA, PHILADELPHIA MUSEUM OF ART, 1985-52-320 AND 1985-52-104, respectively. Peaks represent azelaic (A), palmitic (P), and stearic (S) fatty acid methyl esters, as well as methylated dehydroabietic (DHA), 7-oxo-dehydroabietic (7-oxo-DHA), and 15-hydroxy-7-oxo-dehydroabietic (15-OH-7-oxo-DHA) acids. The P/S ratios of 1.3 and 2.8, respectively, indicate linseed oil in the ink of Diogenes and walnut oil in Hercules. Conifer resin also is present in both inks as signified by the DHA peaks.

An exception to the linseed oil/conifer resin findings was obtained for Ugo's two-block *Hercules Chasing Avarice* (c.1517). The ratio of palmitic to stearic acid for the midtone block is consistent with walnut oil rather than linseed oil (Fig. 12.1b). The ink also contained conifer resin. Walnut/conifer results were obtained from the key block ink, as well.²⁵ Walnut oil was valued highly by artists for use with delicate colours but was more costly than linseed oil, which may explain partially its isolated occurrence in this indigo-containing impression.²⁶ Walnut oil also is said to discolour less upon heating²⁷ than linseed oil, although this impression appears to have yellowed over time. The indigo ink was likely a translucent pale blue when printed but is now a pale green-grey, probably due to the darkening

of the resin-containing vehicle, yellowing of the paper and size and/or fading of the indigo pigment.

The hues of the inks within each impression of these multi-block tonal woodcuts generally are related closely. Nevertheless, a variety of colourants and accessory minerals have been identified in the thirty-nine impressions examined:²⁸

- Reds: red lead (lead tetroxide), red ochre/iron oxide red (hematite), vermilion (mercuric sulphide);
- Yellows: orpiment (arsenic sulphide), yellow ochre/sienna (goethite), organic yellow;
- Greens: green earth (chiefly celadonite), malachite with some associated azurite (basic copper carbonates), verdigris (copper acetates);
- Blues: azurite (basic copper carbonate), indigo/woad;²⁹

25 Four samples were analysed from this impression; all gave P/S values in the 2.2 to 2.9 range, consistent with walnut oil. Further study is planned to determine if walnut oil use correlates with Ugo's early woodcuts or with particular pigments.

26 See A. Livache, ed. J.G. McIntosh, *The Manufacture of Varnishes, Oil Crushing, Refining and Boiling and Kindred Industries* (London: Scott, Greenwood, 1899), 247.

27 In this study, the *Hercules Chasing Avarice* samples, containing walnut oil, gave azelaic to suberic diacid (A/Su) ratios ranging from 1.3 to 1.5, values suggestive of heat bodying. However, the reliability of this method to determine heat treatment has not

been proven. See J.D.J. van den Berg, K.J. van Den Berg and J.J. Boon, 'Identification of Non-cross-linked Compounds in Methanolic Extracts of Cured and Aged Linseed Oil-based Paint Films Using Gas Chromatography-Mass Spectrometry', *Journal of Chromatography*, A950.1–2 (2002), 195–211.

28 The complete list of works studied is on file at the PMA.

29 The main colourants in indigo and woad are chemically similar. Both were available in Europe during the sixteenth century. See

- Whites: basic and neutral lead white (basic lead carbonate and lead carbonate, respectively);³⁰
- Brown: umber (goethite and manganese oxide);
- Blacks: bone black, carbon-containing blacks (vegetable and lamp), iron-containing black;³¹
- Accessory minerals: feldspar, kaolinite, illite, montmorillonite, quartz;
- Extender: calcite (calcium carbonate).

The majority are inorganic (mineral or artificial/synthetic)³² and have a long history of use inclusive of the early Renaissance. The two organic pigments, indigo/woad and a yellow, would have been less lightfast.³³ Taken together, the sixteen colourants indicate that the artists and ink makers took advantage of the relatively broad selection of pigments available.³⁴

Another approach to studying the printing inks is to correlate the colourants with the dark, mid and light tone blocks and the darkest/key block within each print. Table 12.1 displays data distributed in this manner for five impressions of prints by Ugo with a range of green palettes and one by Vicentino with a red palette.³⁵ This arrangement shows that the green palettes were achieved with selective combinations of green earth, malachite, indigo, azurite, orpiment, or yellow ochre, sometimes lightened with lead white or darkened with small amounts of carbon-containing blacks or iron black.

J.H. Hofenk de Graaf, W.G.Th. Roelofs and M.R. van Bommel, *The Colourful Past: Origins, Chemistry and Identification of Natural Dyestuffs* (Switzerland: Abegg-Stiftung; London: Archetype, 2004), 245.

- 30 Lead carboxylates, likely formed from the interaction of lead white and oil, are prevalent especially in the ink on *Death of Ananias* (PMA 1985-52-20871) as determined by MFTIR.
- 31 See A. Stijnman, 'The Colours of Black: Printing Inks for Blockbooks', *Bibliothek und Wissenschaft* 46 (2013), 59–80 for a discussion of black pigments in early relief printing inks.
- 32 Azurite, malachite, green earth and yellow and red ochres were distinguished in mineral forms by PLM/MFTIR and the presence of accessory clays and quartz. Sample IR data were compared with reference spectra in *The Infrared and Raman Users Group Spectral Database*, ed. B. Price and B. Pretzel (Philadelphia: IRUG, 2007), vol. 1–2, spectra IMP00151, IMP00274, IMP00275, and IMP00493.
- 33 The yellow colourant, detected by PLM/MFTIR, was not characterised fully due to sampling constraints.
- 34 For pigment trade in Italy, see L.C. Matthew, 'Vendecolori a Venezia': The Reconstruction of a Profession', *The Burlington Magazine* 144.1196 (2002): 680–86; J.A. DeLancey, 'Shipping Colour: "Valute", Pigments, Trade and Francesco Di Marco Datini', in Kirby, Nash and Cannon, *Trade in Artists' Materials*, 74–85.
- 35 Table 12.1 includes early and late impressions, chosen for ink palette colour and colourant content. Data from study will be interpreted in relation to chronologies of impressions, once proposed.

Frequently, the tone blocks (except the darkest/key) *within* an impression contain similar colourants in differing proportions and/or particle sizes (coarse to fine). For example, in an area of Vicentino's three-block *Christ Healing the Lepers* (1530s or 1540s), where the darkest/key, dark and mid tone inks intersect (Fig. 12.2a), Raman spectra revealed orpiment and indigo that were used in varying quantities to attain the green tones (Fig. 12.2b).³⁶ Pigments present in

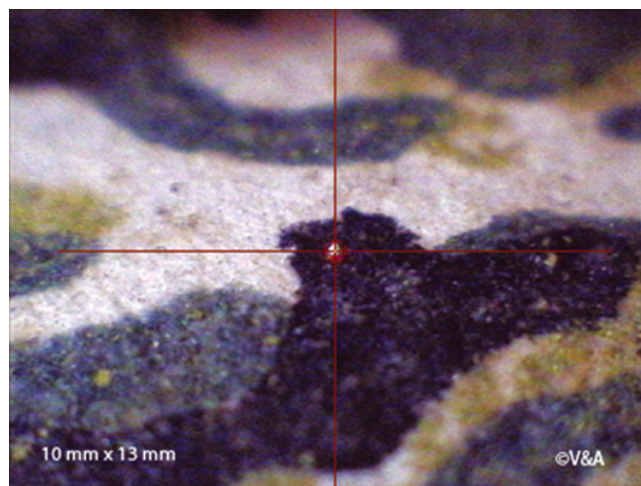


FIGURE 12.2A Niccolò Vicentino, after Parmigianino, *Christ Healing the Lepers*, c.1540, *chiaroscuro woodcut from 3 blocks*, 29.5 × 28.9 cm. Detail showing overlapping inks from mid, dark and darkest/key blocks. LONDON, VICTORIA & ALBERT MUSEUM, E.288-1890; © VICTORIA AND ALBERT MUSEUM, LONDON

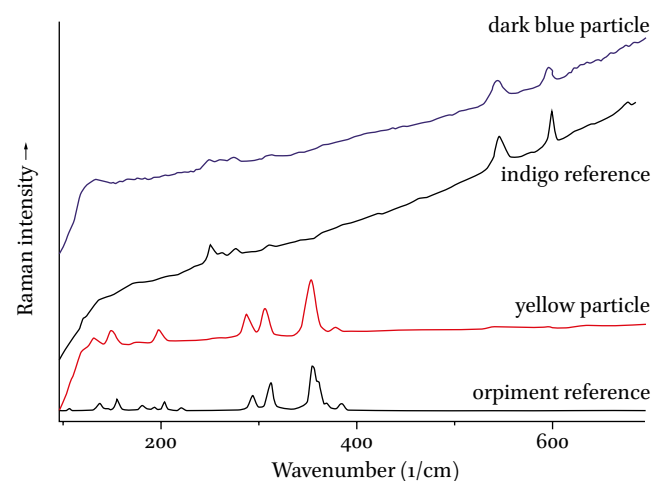


FIGURE 12.2B Raman spectra obtained from yellow and blue particles (638 nm excitation), indicating orpiment and indigo pigments, respectively.

- 36 L. Burgio, V. Lopez, 'Christ Healing the Lepers – Chiaroscuro E.288-1890', *Rep. no. 11-141-LB* (London: Victoria and Albert Museum, Conservation Department, Science Section, 2011), 6.

some inks may be absent in others to alter their tonal values, as illustrated in the table by impressions of Ugo's four-block *Diogenes* (c.1527) and four-block, yellow-brown and olive *Death of Ananias* (1518, printed later). In the blue-green *Diogenes*, green earth was used in the dark and mid tones but not in the light. Similarly, indigo was used selectively in the *Death of Ananias*.

Knowledge of specific pigments can aid in understanding the original appearance of a print, as with the indigo/wood-containing impression of *Hercules Chasing Avarice* that is now pale green-grey. Broad areas of lead white-containing ink in an impression of Vicentino's three-block *Cloelia* (1530s or 1540s) (not shown) have darkened from white to grey, likely from black lead sulphides formed by the exposure of lead carbonate to hydrogen sulphide in air.³⁷ Vicentino's four-block *Saturn* (late 1530s) printed with ink containing vermilion, which can darken under certain circumstances, has not altered appreciably. Several impressions of Vicentino's prints were found to contain coarsely ground orpiment (up to 500µ); highly crystalline and refracting, it confers a sparkling appearance.³⁸ Because orpiment is subject to colour loss under certain conditions, the particles in these impressions may have faded over time.³⁹

Colour Documentation

The second goal of the study was to develop a simple, reliable means for colour identification and naming to correlate subjective colour perception with more objective methods of assessment of the chiaroscuro woodcut printing inks and palettes. Myriad terms have been used in collection catalogues and publications, making colour communication between researchers difficult; one researcher's 'ochre' may be another's 'yellow' or 'orange'. A naming system with a shared vocabulary for more consistent documentation would benefit scholarship. Toward this end, colour names are being developed for the printing inks utilising the

Munsell Color System, Universal Color Language (UCL), and spectrophotometry.⁴⁰

The Munsell Color System is a standard reference in art and industry based on an approximate colour sphere, defined in terms of *hue* (dominant colour), *value* (relative lightness to darkness) and *chroma* (degree of saturation). Colours are given in alpha-numeric notation in the format: hue value/chroma (e.g., 5Y 4/2).⁴¹ The standard Munsell reference set of colour chips comprises two volumes, but a smaller, less costly, more portable binder of *Soil Color Charts* of mostly matte colour swatches is available.⁴² The soil charts, containing circular apertures for easy comparison with specimens, are well-suited to the study of Italian chiaroscuro woodcuts as they provide a useful tonal range for the matte inks containing natural earth and mineral pigments (Fig. 12.3). By visually matching the woodcut inks to the *Soil Color Chart* swatches, Munsell colour notations were generated.

Precise colour matching of the woodcut inks was difficult. Challenges included the layering of inks, their irregular surfaces and uneven deposition, ranging from thin and semi-translucent to thick and opaque. This inherent variation is due partially to the relief printing process, which often leaves thicker deposits of ink along edges of forms (squash). The perceived colour also is affected by degree of ink translucency, colour of the underlying paper, overall and local discolouration, and surface grime. To aid in the colour matching and to mitigate lighting variations, a calibrated light source was positioned near the prints.⁴³ Wherever possible, comparisons were made from ink printed directly on the paper rather than over other ink layers.

The inks also were analysed with a portable spectrophotometer equipped with custom software.⁴⁴ The instrument's

37 L. Burgio, *Rape of Cloelia – Chiaroscuro VA19486, Rep. no. 11-142-LB* (London: Victoria and Albert Museum, Conservation Department, Science Section, 2011), 6.

38 Examples include *Adoration of the Magi* (PMA 1985-52-2093) and *Christ Healing the Lepers* (v&A E288-1890).

39 Light and oxidation induced alterations are discussed in E.W. FitzHugh, 'Orpiment and Realgar', in *Artists' Pigments: A Handbook of Their History and Characteristics*, vol. 3, ed. E. West FitzHugh (Washington: National Gallery of Art, 1997), 51.

40 For an introduction to colour measurement, see P.E. Pierce, and R.T. Marcus, *Color and Appearance* (Blue Bell, PA: Federation of Societies for Coatings Technology, 1994).

41 See Ibid, 10–12 and <http://munsell.com/about-munsell-color/how-color-notation-works> (accessed 21 January 2014).

42 *Munsell Soil-Color Charts with Genuine Munsell Color Chips* (Grand Rapids, MI: Munsell Color, 2009).

43 A CCS Inc. 5000K LED bulb (CRI 97), approximately 45° to the prints.

44 An X-Rite iPro [holographic diffraction grating, diode array detector, Type A (gas filled tungsten) light source, 45/0° geometry, 4 mm aperture, 380–730 nm collection range, 3.5 nm optical/10 nm reporting resolution] and Robin Myers Imaging, SpectraShop, v.4.0.8 (D50 illuminant/2° observer viewing condition) were used. The D50 illuminant correlates with the 5000K light source used for the visual colour assessments. Data were acquired in three locations for each ink and averaged. The X-Rite iPro was recommended by Daniel Kushel and Timothy Vitale, contributors to F.S. Frey et al., *The AIC Guide to Digital*



FIGURE 12.3 Comparisons of three impressions of Ugo da Carpi, after Raphael, Descent from the Cross, c.1518, chiaroscuro woodcut from 3 blocks: left, 36.1 × 29.0 cm (LONDON, BRITISH MUSEUM, W,4.12; © TRUSTEES OF THE BRITISH MUSEUM); centre, 35.4 × 27.9 cm (BOSTON, MUSEUM OF FINE ARTS, 64.1042; PHOTOGRAPH © 2014 MUSEUM OF FINE ARTS, BOSTON); right, 35.8 × 28.5 cm (PHILADELPHIA, PHILADELPHIA MUSEUM OF ART, 1985-52-71). Shown with Munsell Soil Color Chart, image courtesy of X-Rite, Inc.

light weight allowed it to rest safely on the prints (Fig. 12.4). Spectral reflectance curves (wavelengths of light vs. % reflectance) were acquired,⁴⁵ and numerical colour coordinates/colourimetric values were calculated by the software. The same procedure was carried out on the Munsell Soil Color Chart swatches. The swatch data then were stored in a reference library, against which the ink data were compared⁴⁶ to obtain corresponding Munsell colour notations. These 'Munsell notations' are listed in Table 12.1 for each tone block of the six impressions displayed. For example, the notation

for the 'light' tone block of Vicentino's *Saturn* is 2.5YR 6/8, where 2.5YR represents a reddish hue, and the value of 6 and chroma of 8 convey the light, bright character of the colour. The library-derived Munsell notations correlated well with those obtained visually from the soil charts, supporting the reliability of the empirical, visual method.⁴⁷

In addition to Munsell notations, 'colour names' are being developed for each tone block ink based on UCL terms and conventions.⁴⁸ These names comprise a *value* descriptor (light, medium, dark) and a primary perceived *hue*, modified by secondary/tertiary perceived *hues*. By

Photography and Conservation Documentation, ed. J. Warda, 2nd ed. (Washington, D.C.: American Institute for Conservation of Historic and Artistic Works, 2011); correspondence with Nancy Ash, 2011. For Robin Myers Imaging, see <http://www.rmimaging.com> (accessed 21 January 2014).

⁴⁵ Data are on file at the PMA.

⁴⁶ Comparisons were made using ΔE_{2000} colour difference values ($5\Delta E$ tolerance).

⁴⁷ Data compiled/compared by Soon Kai Poh and Valerie Smosna (summer interns, Paper Conservation, PMA, 2013).

⁴⁸ The UCL provides consistent colour nomenclature for industry/the arts. See K.L. Kelly and D.B. Judd, *Color: Universal Language and Dictionary of Names* (Washington, D.C.: National Bureau of Standards, 1976).



FIGURE 12.4 *X-Rite iLPro spectrophotometer with an impression of Ugo da Carpi, after Parmigianino, Diogenes, c.1527–30, chiaroscuro woodcut from 4 blocks, 40.9 x 30.4 cm*
PHILADELPHIA, PHILADELPHIA MUSEUM OF ART, 1985-52-170

using the Munsell colour notation assigned to an ink, an Inter-Society Color Council-National Bureau of Standards (ISCC-NBS) colour designation is determined⁴⁹ and then adapted *within* the context of the limited palette of the chiaroscuro print to produce a 'colour name'. Colour names are shown for each tone block in Table 12.1; for example, the 'colour name' for the light tone block of Vicentino's *Saturn* is 'light orange-red' (adapted from the ISCC-NBS designation 'moderate orange'). Thus far, the tone block ink colours on the impressions characterised fall into the red, yellow and green hue groups, with an occasional blue-hued ink, with values ranging from light to dark and chroma with low to medium saturation.⁵⁰

To convey the narrow range of closely-related tones within each impression, without listing each individual tone block 'colour name,' it is useful to refer to the impression colour as the 'ink palette.' The palette naming still is being refined, but is based on the dominant hue(s) assigned to the tone blocks, taking into account the overall appearance of a print. For example, in Table 12.1, the

'ink palette' for Ugo's four-block *Death of Ananias* (PMA 1985-52-322) is 'olive.' A lexicon containing ink palette names for all impressions studied, with corresponding Munsell notations and colour names for individual tone blocks, is planned.

Watermarks

The third objective of the study was to document watermarks. During visits to museum print rooms, a portable LED light sheet⁵¹ was used to provide transmitted light to aid in the detection of watermarks and reveal other aspects of print condition and printing process. The setup included a transparent millimetre scale to capture watermark dimensions and a light shield to exclude ambient light and enable photography *in situ*.⁵² The watermarks documented in the group of thirty-nine impressions of prints by Ugo and Vicentino are Italian and appropriate for the time period; examples listed in Table 12.1 are 'Crossbow & Arrow', 'Pilgrim' and 'Anchor'.⁵³ All watermarks will be studied for recurrence patterns and correlations that may suggest printing campaigns and relationships between artists/workshops and/or support reattributions of certain prints.

An ancillary benefit of the portable light sheet was revealed while searching for a watermark in a 'variant' impression of Ugo da Carpi's *Venus & Cupids*. *Venus & Cupids* typically was printed from four blocks in four colors, as in an impression from the British Museum (W.4.19; Fig. 12.5a), printed in black and three shades of brown ink. The 'variant' impression at the Museum of Fine Arts, Boston (c.1521, 64.1092) (Fig. 12.5b) was thought to have been printed from three blocks (two blacks and a light grey-green) instead of the standard four. Transmitted light revealed the use of a fourth block in the Boston impres-

51 Dongbu Lightec (DLC) LumiSheet 5300K LED panel (216 mm W x 279 mm L x 4mm D) purchased from Evo-Lite. LLC.



52 Images/data are on file the PMA and were compiled/refined by Kimberly Tamboer and Devon Baker (graduate student interns, Department of Prints, Drawings and Photographs, PMA, 2013). Unclear or indecipherable images were enhanced digitally using Adobe Photoshop (CS5 Extended v.12.0x32) to improve legibility.

53 Watermarks were compared with standard references; see C.-M. Briquet, *Les filigranes: dictionnaire historique des marques du papier dès leur apparition vers 1282 jusqu'en 1600* (repr. New York: Hacker Art Books, 1966) and D. Woodward, *Catalogue of Watermarks in Italian Printed Maps, ca. 1540–1600* (Chicago: University of Chicago Press, 1996). To date, watermarks have been detected in 375 impressions, including prints by Antonio da Trento and Domenico Beccafumi.

49 Using the Munsell hue, an ISCC-NBS colour-name chart is selected, and the value and chroma are plotted to obtain the colour designation; *Ibid.*, 16–31.

50 650 impressions, including the group of thirty-nine works discussed in this paper, have been characterised thus far.

TABLE 12.1 *Technical Study Results for Selected Impressions of Ugo da Carpi's and Giuseppe Niccolò Vicentino's Chiaroscuro Woodcuts*

IMPRESSION		DIOGENES PMA 1985-52-320				DEATH OF ANANIAS PMA 1985-52-322			
									
ARTIST		Ugo da Carpi				Ugo da Carpi			
INK PALETTE		Blue-green				Olive			
WATERMARK		CROSSBOW & ARROW (est., barely discernible)				N/D			
TONE BLOCK		Darkest/ Key	Dark	Mid	Light	Darkest/ Key	Dark	Mid	Light
TONE BLOCK INK COLOUR	MUNSELL NOTATION ^(a)		5GY 6/1	10Y 6/2	5Y 7/2		5Y 4/2	2.5Y 5/3	2.5Y 5/2
	COLOUR NAME ^(b)	Black	Medium green- grey	Medium grey yellow- green	Light grey- olive	Black	Dark grey- olive	Medium yellow- olive	Medium grey- brown
VEHICLE ^(fg)	LINSEED OIL + CONIFER RESIN	X	X	X	X	X	X	X	X
	WALNUT OIL + CONIFER RESIN								
WHITE	LEAD WHITE, BASIC +/OR NEUTRAL ^(c,d) $\text{Pb}_3(\text{CO}_3)_2(\text{OH})_2$ +/OR PbCO_3		○	○	○				
	CALCITE ^(c,f) CaCO_3								
GREEN	GREEN EARTH ^(c,d) $\text{K}(\text{Mg,Fe})(\text{Fe,Al})\text{Si}_4\text{O}_{10}(\text{OH})_2$		●	●			●	●	●
	MALACHITE ^(c,f) $\text{Cu}_2(\text{CO}_3)(\text{OH})_2$						◐	◐	◐
BLUE	INDIGO ^(fg) $\text{C}_{16}\text{H}_{10}\text{N}_2\text{O}_2$		●	●	●				
	AZURITE ^(c,f) $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$		◐	◐	◐		—	—	—
YELLOW	ORPIMENT ^(c,e) As_2S_3		●	●	●		●	●	●
	YELLOW OCHRE ^(c,f) $\text{FeO}(\text{OH})$						◐		
RED	VERMILION ^(c,e) HgS								
	RED OCHRE ^(c,f) Fe_2O_3	●							
BLACK	VEGETABLE BLACK ^(d) C	●							
	CARBON BLACK ^(d) C								
	IRON CONTAINING ^(c,d)					●			

KEY: N/D = not detected, N/P = block not present, a = spectrophotometry, b = UCL-adapted, c = SEM-EDS, d = PLM, e = Raman, f = MFTIR, g = PY-GCMS, ◐ = minor component, * = paper filler or minor pigment, — = naturally occurring with malachite, very minor component





DEATH OF ANANIAS PMA 1985-52-2192				DEATH OF ANANIAS PMA 1985-52-20871				HERCULES CHASING AVARICE PMA 1985-52-104				SATURN PMA 1985-12-169			
															
Ugo da Carpi				Ugo da Carpi				Ugo da Carpi				Vicentino			
Yellow-brown & olive				Blue-green				Green-grey				Orange-red			
N/D				PILGRIM holding a staff in a circle				N/D				ANCHOR with double outline in circle, six-pointed star above			
Darkest/ Key	Dark	Mid	Light	N/P	N/P	N/P	Light	Darkest/ Key	N/P	Mid	N/P	Darkest/ Key	Dark	Mid	Light
	2.5Y 6/4	10YR 6/4	10YR 6/4				5GY 5/1			10Y 6/1			2.5YR 5/6	2.5YR 5/6-8	2.5YR 6/8
Black	Medium yellow- olive	Medium yellow- brown	Medium yellow- brown				Medium green- grey	Black		Medium green- grey		Black	Medium orange- red	Medium orange- red	Light orange- red
X	X	X	X				X					X	X	X	X
								X		X					
	○	○	○				○								
										*			○	○	○
	●	●	●												
	●	●					●			●					
	—	—	—												
	●	●	●				●								
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FIGURE 12.5 *Ugo da Carpi, after Baldesare Peruzzi, Venus & Cupids, c.1521, chiaroscuro woodcut from 4 blocks. (12.5a) Detail, normal light, 27.0 × 42.4 cm (LONDON, BRITISH MUSEUM W,4.19; © TRUSTEES OF THE BRITISH MUSEUM). (12.5b) Detail, normal light, 27.1 × 40.8 cm (BOSTON, MUSEUM OF FINE ARTS, 64.1092; PHOTOGRAPH © 2014 MUSEUM OF FINE ARTS, BOSTON). (12.5c) Detail, transmitted light, as Fig. 12.5b.*

sion (Fig. 12.5c) by allowing observation of greater ink density where the designs, printed from two of the blocks, in the same or subtly different light grey-green inks, overlap – the two inks are now virtually indistinguishable under normal light (compare lower right foreground in Fig. 12.5b and 12.5c).

Summary

Selected results from an ongoing technical study of sixteenth-century Italian chiaroscuro woodcut printing inks have been presented, along with approaches to consistent colour identification, colour naming and watermark documentation. The ink colourants in thirty-nine impressions of prints by Ugo da Carpi or Giuseppe Niccolò Vicentino have been characterized, as well as the vehicles in twenty-seven of the works. The vehicles were all linseed oil/conifer resin-based except in one impression with walnut oil/conifer resin. Additional analyses will be undertaken to determine if the occurrence of walnut oil is a rarity

or is more prevalent. This study has provided the first reported scientific confirmation of Giorgio Vasari's statement of Ugo's use of oil colour for his woodcuts and has corroborated inferences drawn from historical texts regarding the vehicles of early modern woodcut printing inks.

Ink colours are being documented using the Munsell Color System and UCL standard references, as well as spectrophotometry, and colour names are being assigned to the printing inks and ink palettes. This method, which continues to be refined, helps to avoid the ambiguity associated with subjective naming. It is proposed that this approach be adopted more widely to create a shared vocabulary that will facilitate communication between institutions and scholars.

The woodcuts studied to date represent a small portion of survivals. Further study is needed to determine if the materials identified in this group were used in additional impressions of prints by Ugo, Vicentino and other artists. This work will lead to a deeper appreciation of the material aspects of sixteenth-century Italian chiaroscuro woodcut prints.

‘Divine, August and Immortal’: The Potentials and Limitations of Colour Printing in the Low Countries, c.1555

Edward H. Wouk

In 1555, two sophisticated colour-printed woodcuts were published after the designs of the Netherlandish artist Frans Floris de Vriendt: *David Playing the Harp before King Saul* (Fig. 13.1), recorded in numerous impressions,¹ and the *Hunts* (Fig. 13.2), a monumental and extremely rare print, which was nearly unprecedented in scale and ambition.² They bear Floris’s signature as inventor, and another dozen remarkable colour prints have been associated with his designs.³ Floris’s brief engagement with colour woodcuts coincided with another significant colour printing project: the medallion-like portraits included in Hubert Goltzius’s magisterial account of Roman emperors. Published in Antwerp by Gillis Coppens van Diest in 1557, the volume’s title advertised the use of painterly colour in its illustrations: *Vivae Omnium fere Imperatorum Imagines...suis coloribus historico penicillo delineatae* (Images of nearly all the Emperors...painted in their colours with a historic brush).⁴ Yet while Floris and

Goltzius produced art for the same audience and were united by a deep admiration for their teacher Lambert Lombard of Liège, the striking similarities between their colour printing projects have hitherto received little attention. This study examines Floris’s and Goltzius’s colour prints within the context of a nascent discourse on the graphic arts in the North. It analyses Floris’s early attraction to the properties of colour woodblock printing, addressing the question of why the production of colour prints after his designs ceased nearly as suddenly as it began. The paper argues that Floris’s and Goltzius’s approaches to this novel technique reveal the shifting views of their humanist audience about the possibilities and potential limitations of using colour printing to celebrate the visual heritage of the classical past.⁵

Appropriating the Objective Value of Coins

Hubert Goltzius, a peripatetic artist, humanist and entrepreneur, occasionally sold and produced paintings.⁶ His *Last Judgment* (1557) shows a close affinity to Floris’s painted oeuvre.⁷ Yet he is best known for his volumes on the life of Caesar and his numismatic treatises, for which he won the title of *Civis Romanus* from the Roman Senate.⁸ In the preface to the *Imperatorum Imagines*, his first major treatise, Goltzius explained that he discovered

- 1 Woodcut from four blocks, 336 × 482 mm; E. Wouk, *Frans Floris*, ed. G. Luijten, 2 vols., NH-DF (Ouderkerk aan den IJssel: Sound and Vision, 2010), 1: 2, no. 1.
- 2 Woodcut from three blocks in six parts, 431 × 2625 mm, as mounted together; *Ibid.*, 2: 18, no. 9.
- 3 *Ibid.*, 1: 6–16, nos. 2–8; 2: 225–25, nos. R1–2; Cornelis Anthonisz.’s *Last Supper* was attributed erroneously to Floris; see, for example, J. Renouvier, *Des types et des manières des maîtres graveurs: pour servir à l’histoire de la gravure en Italie, en Allemagne, dans les Pays-Bas et en France*, 4 vols. (Montpellier: Boehm, 1853–56), 2: 151.
- 4 H. Goltzius, *Vivae omnium fere imperatorum imagines* (Antwerp: Gillis Coppens van Diest, 1557). The volume was issued in Latin, German, and Italian simultaneously, in French in 1559, and in Spanish in 1560. For its history, see M. Hoc, ‘Goltzius (Hubert)’, in *Bibliotheca Belgica: Bibliographie Générale des Pays-Bas*, M.-T. Lenger (original ed. F. van der Haeghen), 7 vols. (Brussels: Culture et Civilisation, 1964–75), 3: 241–44, nos. G 380–G 384; C.E. Dekesel, *Hubertus Goltzius: The Father of Ancient Numismatics* (Ghent: Bibliotheca Numismatica Siliciana, 1987), 11–67. Dekesel speculates that fewer than 250 exemplars were printed in each language, although the number may in fact be lower since the etched plates would have become visibly worn after hundreds of impressions; see A. Stijnman, *Engraving and Etching, 1400–2000: A History of the Development of Manual Intaglio Printmaking Processes* (London: Archetype; Houten: Hes & De Graaf, 2012), 333.

- 5 For the use of colour printmaking to celebrate classical heritage in seventeenth-century France, see A. Dencher, ‘The “Camaïeu” Print’, this volume, 180–86.
- 6 W. Le Loup, *Hubertus Goltzius en Brugge 1583–1983*, exh. cat. (Bruges: Gruuthusemuseum, 1983–84).
- 7 A. Montballiu, ‘De schilderscarrière van Hubertus Goltzius (1526–83): Aantekeningen bij drie vergeten documenten’, *Jaarboek Koninklijk Museum voor Schone Kunsten, Antwerpen* (1984): 203–15. See also Le Loup, *Hubertus Goltzius*, 8; G. Denhaene, *Lambert Lombard, Renaissance et humanisme à Liège* (Antwerp: Mercator, 1990), 220, fig. 290. Goltzius’s presence in Lombard’s milieu is discussed most recently by G. Denhaene in *Lambert Lombard: peintre de la Renaissance* (Brussels: IRPA, 2006; *Scientia Artes* 3), 476–77, no. 124.
- 8 W. Le Loup, ‘Hubert Goltzius drukker-graveur’, in Le Loup, *Hubert Goltzius*, 39–50.



FIGURE 13.1 Joos Gietleughen after Frans Floris de Vriendt, David Playing the Harp Before Saul, 1555, *chiaroscuro woodcut from four blocks*, 33.6 × 48.2 cm
LONDON, BRITISH MUSEUM, 1852,0612.11; © TRUSTEES OF THE BRITISH MUSEUM



FIGURE 13.2 Joos Gietleughen after Frans Floris de Vriendt, The Hunts, 1555, *chiaroscuro woodcut from three blocks*, 43.1 × 262.5 cm
PARIS, BIBLIOTHÈQUE NATIONALE DE FRANCE, CABINET DES ESTAMPES, AA6 RÉs., FORMERLY CC-6-FOL; BY PERMISSION OF THE BIBLIOTHÈQUE NATIONALE DE FRANCE

numismatics during his time with Lombard, 'the patron and reformer of sciences in these lands, who chased away the barbarian customs and restored to these regions the true science [of art]'.⁹ In 1565, he set aside other projects

to edit Dominicus Lampsonius's *Vita... Lamberti Lombardi*, a panegyric on Lombard that celebrates his vast learning, his role in educating a generation of Netherlandish artists and his early championing of printmaking in the North.¹⁰

⁹ Goltzius, *Imperatorum Imagines*, preface. See H. Hymans, 'Lambert Lombard', in *Oeuvres de Henri Hymans* 4 vols. (Brussels: Hayez, 1920, repr. from *Bulletin de l'Académie royale de Belgique*, 1892) 1: 246–47; Denhaene, *Lambert Lombard*, 207–15, dates Goltzius's time with Lombard to 1544–46.

¹⁰ D. Lampsonius, *Lamberti Lombardi apud Ebvrones pictoris celeberrimi vita* (Bruges: Hubert Goltzius, 1565); trans. J. Hubaux and J. Puraye, 'Dominique Lampson, *Lamberti Lombardi apud Ebvrones pictoris celeberrimi vita*: traduction et notes', *Revue belge d'archéologie et d'histoire de l'Art* 18 (1949), 53–77.

Goltzius dedicated the *Vita ... Lamberti Lombardi* to the cartographer Abraham Ortelius, justifying his decision to publish the text – the first artist's biography written in the Netherlands – by praising both its author, Lampsonius, and its subject, Lombard, focusing on the latter's prodigious knowledge, treatment of colour and mastery of the graphic arts.¹¹ Lombard's pupils and admirers engaged with other artists' work, disseminated their own art and demonstrated their erudition by trading, collecting and producing prints. Many in Lombard's circle moved to Antwerp and contributed to the flourishing of printmaking, particularly at Hieronymus Cock's Aux Quatre Vents press, which published prints after Italian and Netherlandish artists (including Lombard and Floris) under Lampsonius's guidance.¹²

Ortelius avidly collected coins as well as prints, particularly engravings by Northern masters.¹³ A central figure in a growing network of Netherlandish humanists, he opened his numismatic collection to Goltzius to facilitate his research for the *Imperatorum Imagines*. He also introduced Goltzius to Marcus Laurinus of Bruges, Lord of Watervliet, who became his Maecenas,¹⁴ hiring him to publish his own numismatic collection and funding his

two-year study trip to coin collections across Europe.¹⁵ Upon Goltzius's return, Laurinus and his brother, the philologist Guido, helped him establish a press in Bruges from which to publish his luxurious numismatic treatises and other volumes of classical learning.¹⁶ They respected Goltzius as an authority on antiquities and as an etcher, and later collaborated with him and Ortelius.¹⁷

In 1967, Konrad Oberhuber identified the publisher's address at the lower right corner of Floris's *David Playing the Harp*, 'Jodocus de Curia excudebat', as the Latinised name of Joos Gietleughen, a painter and woodcutter from Courtrai who, according to Karel van Mander, cut the woodcut tone blocks to complement Goltzius' etched plates of the *Imperatorum Imagines*.¹⁸ Van Mander appears to have known Gietleughen and was impressed with his skill. He may have learned of Gietleughen from any number of sources, possibly from his own teacher, the painter and poet Lucas d'Heere of Ghent, a pupil of Floris

- 11 Lampsonius, *Vita*, preface. On Ortelius's coin collection, see C.E. Dekesel, 'Abraham Ortelius: numismate', in *Abraham Ortelius (1527–1598): Cartograph et humaniste* (Turnhout: Brepols, 1998), 181–92.
- 12 See T. Riggs, 'Hieronymus Cock, 1510–1570: Printmaker and Publisher in Antwerp at the Sign of the Four Winds' (PhD diss., Yale University, New Haven, 1971; New York: Garland, 1977), esp. 43–71, 157–79; E. Wouk, "'Uno stupore ed una maraviglia': The Prints of Frans Floris de Vriendt", in Wouk, *NH-DF Floris 1: xxxiii–civ*, esp. xxxiii–xlv. On Lampsonius's championing of printmaking as a distinctively Northern achievement, see W.S. Melion, 'Theory and Practice: Reproductive Engraving in the Sixteenth-Century Netherlands', in *Graven Images: The Rise of Professional Printmakers in Antwerp and Haarlem, 1540–1640*, exh. cat., ed. L. Silver and T. Riggs (Evanston: Northwestern University Press, 1993), 47–69.
- 13 I. Buchanan, 'Dürer and Abraham Ortelius', *Burlington Magazine* 124 (1982): 734–41; N. Büttner, 'Abraham Ortelius comme collectionneur', in *Abraham Ortelius: 168–81*, esp. 171–78. See also G. Denhaene, 'Abraham Ortelius (1527–1598): Collectionneur de portraits gravés', *Archives et Bibliothèques de Belgique* no. 89: *La gravure de la Renaissance aux Pays-Bas méridionaux* (2010): 29–46.
- 14 M. Hoc, 'Hubert Goltzius, éditeur et imprimeur de Bruges de 1562 à 1578', *Annales de la société d'Émulation de Bruges* 68 (1925): 21–34; H. De la Fontaine Verwey, 'The First Private Press in the Low Countries: Marcus Laurinus and the Officina Golziana', *Quaerendo* 2.4 (1972): 294–310; Dekesel, *Hubertus Goltzius*, 187–89. Laurinus's friendship with Ortelius is attested to by his inscription in the latter's *Album Amicorum*, fol. 23^r; see J. Puraye, 'Album Amicorum Abraham Ortelius', *De Gulden passer* 45–46 (1969), 23^r.

- 15 Goltzius's itinerary is reconstructed in Dekesel, *Hubertus Goltzius*, 6, fig. 11. See also N. Dacos, *La découverte de la Domus Aurea et la formation des grotesques à la Renaissance*, Studies of the Warburg Institute 31 (London: Warburg Institute; Leyden: Brill, 1969), 148–49.
- 16 Roersch in *Bibliotheca Belgica* 3: cols. 461–69; Hoc in *Bibliotheca Belgica* 3: cols. 246–49; Le Loup, *Hubert Goltzius*, 133–59.
- 17 See T.L. Meganck, 'Abraham Ortelius, Hubertus Goltzius en Guido Laurinus en de studie van de Arx Britannica', *Koninklijke Nederlandse Oudheidkundige Bond* 98 (1999), 226–36.
- 18 K. Oberhuber, *Zwischen Renaissance und Barock: Das Zeitalter von Bruegel und Bellange*, exh. cat. (Vienna: Albertina, 1967), 101. On Gietleughen, see H. Miedema, ed., *Karel van Mander: The Lives of the Illustrious Netherlandish and German Painters, From the First Edition of the Schilder-boeck (1603–1604)*, 6 vols. (Doornspijk: Davaco, 1994–99), 1: 249–54 (fol. 247^v–49^r). Some of the blocks in the *Imperatorum imagines* are marked with a 'G', apparently for Gietleughen. J. Weale, 'Hubert Goltz dit Goltzius', *Le Beffroi* 3 (1866–70), 246–70, esp. 251, identifies Gietleughen with a Josse van Gulleghem, who, according to Hymans, was from Gulleghem, a village near Courtrai; see H. Hymans, *Le Livre de Peintres de Carel van Mander*, 2 vols. (Paris: J. Rouan, 1884–85) 1: 376, n. 4. Gietleughen's dates of birth and death are uncertain, although he may have continued to produce prints for Christophe Plantin through 1585, when his monogram appeared on woodcuts for an edition of Hadrian Junius's *Emblemata*. Arnold erred when he concluded that Gietleughen died before his project for Goltzius was finished; see T.J.I. Arnold, 'Broeder Cornelis Adriaensz. Van Dordrecht, "Een Pleidooi"', *De Dietsche Warande: Nederlandsch Tijdschrift voor Aesthetische Beschaving*, N.S. 2 (1879), 565, n. 4. On the Latin nomenclature for Courtrai (Kortrijk), see S.J. de Laet, 'Cortoriacum (Courtrai) Belgium', in *The Princeton Encyclopedia of Classical Sites*, ed. Richard Stillwell, W.L. MacDonald, M. Holland (Princeton: Princeton University Press, 1976), 245.

who likely also collaborated with Gietleughen when the latter cut woodblocks, some after d'Heere's designs, for Johannes Sambucus's *Emblemata* (1564).¹⁹ While *excudat* stresses Gietleughen's role as the editor of the Floris print, new evidence shows that he also cut the woodblocks, using the technique he mastered for Goltzius's volumes to create sophisticated colour prints appropriate to Floris's *all'antica* designs.²⁰

For Goltzius's *Imperatorum Imagines*, begun before Floris's prints were issued, Gietleughen cut two woodblocks per etched image, as in *Emperor Vitellius* (Fig. 13.3).²¹ A darker tone provides the background for the effigy, a lighter tone the flesh-tone and the background for the inscription, and the white of the paper the highlights. As James Weale noted in 1866, the first edition of the *Imperatorum imagines* was a testing ground in which the printer experimented with a range of tones, some of which have fared better than others. The ochre and brown tones now often appear too dark, obscuring the etching. Pending technical examination of the inks, it is unclear what caused this seeming discolouration, which might be the result of a number of factors. Editions printed with paler olive and green tones generally remained more legible over time.

While the registration of the two blocks and one etched plate is usually accurate in surviving editions, the process was inherently complex. To simplify printing, the darker



FIGURE 13.3 *Hubert Goltzius and Joos Gietleughen, after Hubert Goltzius, Aulus Vitellius Germanicus Augustus, etching and chiaroscuro woodcut from two blocks, 18.1 × 18.3 cm. In: Hubert Goltzius, Vivae omnium Imperatorum Imagines (Antwerp: Gillis Coppens van Diest, 1557), no. 9* NEW YORK, METROPOLITAN MUSEUM OF ART, DEPARTMENT OF DRAWINGS AND PRINTS, BEQUEST OF PHYLLIS MASSAR, 2011, 2012.136.954; © METROPOLITAN MUSEUM OF ART

tone blocks were later discarded, and additional lines or dots were added to the etched plate in compensation. Finally, the heavily-worn etched plates, which could no longer be printed satisfactorily with Goltzius's designs but could be sold or reused for other prints, were replaced by woodcut key blocks. Although this disturbed the subtle aesthetic of Goltzius's original conception, it obviated the need for the combination of intaglio and relief printing. Thereafter, editions would be printed exclusively in a flatbed press, as the Plantin Press did when it reissued the volume in 1645.²²

- 19 W. Waterschoot, 'Lucas D'Heere und Johannes Sambucus' in *The Emblem in Renaissance and Baroque Europe: Tradition and Variety*, ed. A. Adams and A. Harper (Leyden: Brill, 1992), 45–52; Arnold, *Broeder Cornelis Adriaensz.*, 563–64. The attribution of Sambucus's emblems is repeated in H-DF 7: 201, no. 135. The monograms JG and IC associated with Gietleughen are discussed in G.K. Nagler, *Die Monogrammisten*, 6 vols. (Munich: Hirsh, 1877–1920), 2: no. 214 (rejecting an earlier identification with Jean Croissant), no. 3106, and no. 2632 (Goltzius). The monogram has also been confused with that of Gerard Janssen van Kampen, a woodcutter who also worked for Christopher Plantin; see Delen, *ad indicem*; L. Voet, *The Golden Compasses: The History of the House of Plantin-Moretus*, 2 vols. (London: Routledge & Kegan Paul, 1969–72) 1: 200–01.
- 20 On the use of *excudere* in its various forms on prints, see D. Landau and P. Parshall, *The Renaissance Print, 1470–1550* (New Haven and London: Yale University Press, 1994), 288, 302–04. The significance of the imperfect form is discussed by A. Chastel, 'Signature et signe', *Revue de l'Art* 26 (1974): 8–15.
- 21 See note 4, above. Weale, *Hubert Goltz dit Goltzius*, 251; A.J.J. Delen, *Histoire de la gravure dans les ancien Pays-Bas et dans les provinces Belges*, 2 vols. (Paris: G. van Oest, 1924–34) 2.2: 116–17; N. Bialler, *Chiaroscuro Woodcuts: Hendrick Goltzius (1558–1617) and his Time*, exh. cat. (Amsterdam: Rijksmuseum; Ghent: Snoeck-Ducaju, 1992), 30–34. Gietleughen also produced the volume's frontispiece, framed in a masterful chiaroscuro strapwork design in the manner of Cornelis Floris.

- 22 H. Goltzius, *Icones imperatorum Romanorum*, rev. ed. (Antwerp: Moretus, 1645), all portraits printed from two woodblocks newly cut by Christoffel Jegher; second edition with these same blocks: Antwerp: Verdussen, 1708.

More than a process of trial-and-error, this repeated experimentation with colours and blocks reflects a conceptual refinement of both the matrix and the resulting images: enlarged impressions of coins and medals. While ostensibly printed as 'illustrations' accompanying the text, these prints assumed an elevated status as 'primary evidence'.²³ Goltzius's combination of etching and woodcut and the careful selection of tones yielded images that resembled in colour and shape the coins and medals which were his sources. Yet, in their standardised and greatly enlarged size (nearly 18 cm in diameter), uniform vertical orientation and high degree of completeness, they almost superseded their small referents, which were often degraded, damaged or mutilated. Goltzius, as 'inventor' of this procedure, proclaimed authority not only over the systematic arrangement of the coins and medals represented in his volume – and, thus, of their value as instruments of knowledge – but also over how they were mediated through his agency, becoming standardised representations of ancient objects restored to perfection and 'restruck' as prints for a new era and new audiences. Inherently detached from the smaller, imperfect metal specimens they purport to represent, these prints became independent objects, opening the way for new cultures of collecting and systems of classification for the venerable field of numismatics while also circulating as marvels of the novel medium of print.²⁴

Gietleughen was an indispensable partner in this process. His connection to Goltzius and Floris placed him at the center of innovation in print production in the Southern Low Countries in the 1550s. Goltzius, who identified Gietleughen's talents at an early date, was married to Elizabeth Verhulst, sister of Mayken (Marie) Verhulst, an important artist and the wife and business partner of the painter and publisher Pieter Coecke van Aelst. Some of Coecke's drawings reveal his interest in chiaroscuro.²⁵ While it is unclear whether he was a blockcutter, he and his wife published books with some of the most sophisticated woodcuts produced in the Netherlands at the time and printed them with Gillis Coppens van Diest, the printer who would produce Goltzius's *Imperatorum imagines* and later Ortelius's *Theatrum orbis terrarum*.²⁶ In theory, Gietleughen

could have been involved in Coecke's or Coppens van Diest's endeavours; he was surely aware of them.

Colour and the Authority of the Antique

As Gietleughen's twelve-year project for Goltzius neared completion,²⁷ he began translating Floris's figural compositions into chiaroscuro woodcuts. Floris, the leading proponent of an Italianate artistic idiom in the North, took a classicising approach to subject, composition, and style. It is likely that Floris first encountered the chiaroscuro woodcut in Italy, and he identified the technique as a powerful means to display and disseminate his familiarity with antiquity and recent Italian art.²⁸ The surviving drawings of Floris's Italian sketchbook reveal how he selectively studied ancient sculptures and Renaissance art in order to assimilate a new formal language that would serve as the basis for his future narrative compositions.²⁹ After returning from Italy in the mid-1540s, he relied heavily on these studies, producing images in what has been termed a 'relief-like style' based on the conventions of ancient sculpture and the large *all'antica* fresco cycles of Raphael's followers.³⁰

Floris's chiaroscuro woodcuts – themselves cut from blocks carved in relief – explicitly recall the relief-like, sculptural properties of the ancient marbles and modern frescoes that had captured his attention in Italy. Achim Gnann recently discovered a print of *Venus and Cupid* (Fig. 13.4), probably carved by Gietleughen after Floris's design and, like his other woodcuts, dated 1555.³¹ This rare print represents the *Venus Felix of Cnidian type with Amor*, a classical statue group of the second century ad, which had been brought to the Vatican Belvedere in 1509 by

and B. op de Beeck, *Belgica Typographica 1541–1600: catalogus librorum impressorum ab anno MDXLI (1541) ad annum MDC (1600) in regionibus quae nunc Regni Belgarum partes sunt*, vol. 4 (Nieuwkoop: De Graaf, 1994), 336–37.

²⁷ See note 18 above.

²⁸ On the workshops that produced Italian chiaroscuro, see L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 123–39; Landau and Parshall, *Renaissance Print*, 154; on Floris's stylistic development, see E. Wouk, "*Raffaello fiammingo*": The Graphic Work of Frans Floris de Vriendt (1519/20–1570) (PhD diss., Harvard University, 2010), 1–125.

²⁹ Wouk, "*Raffaello fiammingo*", esp. 1–43.

³⁰ See M. Hall, *After Raphael: Painting in Central Italy in the Sixteenth Century* (Cambridge: Cambridge University Press, 1999), esp. 129–72.

³¹ Vienna, Albertina, inv. DG2013/20. See A. Gnann, *In Farbe! Clair-obscur-Holzschritte der Renaissance* (Vienna: Albertina, 2013), 308–09, no. 151.

²³ A. Momigliano, 'Ancient History and the Antiquarian', *Journal of the Warburg and Courtauld Institutes* 13 (1950): 285–315.

²⁴ F. Haskell, *History and its Images: Art and the Interpretation of the Past* (New Haven and London: Yale University Press, 1993), 16–17.

²⁵ R. Judson, in J.H. Hand, et al., *The Age of Bruegel: Netherlandish Drawings of the Sixteenth Century*, exh. cat. (New York: Morgan Library, 1986), 113–14, no. 35.

²⁶ A. Rouzet, *Dictionnaire des imprimeurs, libraires et éditeurs des XVe et XVIe siècles dans les limites de géographiques de la Belgique actuelle* (Nieuwkoop: De Graaf, 1975), 45–46; G. Glorieux



FIGURE 13.4 Joos Gietleughen, after Frans Floris de Vriendt, *Venus and Cupid*, 1555, chiaroscuro woodcut from four blocks, 42.3 × 21.5 cm
VIENNA, ALBERTINA, DG2013/20; ALBERTINA, VIENNA

Julius II.³² In contrast to many of the drawings Floris made in Rome, which generally respect the fragmentary nature of broken antiquities and record their imperfections in detail, the artist freely 'restored' this sculptural group in his lost design for the woodcut. He added arms and a bow and arrow to the broken statues and placed the figures on a plinth before a crumbling niche overgrown with plants

to evoke the appearance of a Roman sculpture court. The print, like many of Floris's surviving Roman drawings, is inscribed with the term '*Antyque*' to designate the age of its purported antecedent and the aesthetic perfection that 'antique' art embodied for Floris's humanist audience.³³

Whereas in *Venus and Cupid* Floris reconstituted and enlivened a fragmentary sculpture group to give it new form in print, in *David Playing the Harp* he translated studies of 'antique' figures into a cohesive composition, arranging monumental, semi-nude males as if in a classical frieze, set before a shallow, box-like space. A prominent citation of one figure from Michelangelo's *Crucifixion of Saint Peter* in the Pauline Chapel has been noted.³⁴ Far from a pastiche, though, Floris's image recalls the coherent treatment of figure and space in the large-scale fresco cycles underway when he visited Rome, especially Perino del Vaga's *History of Alexander* in the Sala Paolina, Castel Sant'Angelo, in which elaborately framed compositions are filled with heroic semi-nude figures derived from antique sculpture, arranged in frieze-like processions and painted in monochrome to resemble ancient reliefs.³⁵

Even more than *David Playing the Harp*, the three *Hunts* rely on the viewer's familiarity with the idea of an antique frieze as a progression of figures in separate but related episodes, read sequentially from left to right. Floris's Roman drawings reveal that he perfected his command of the pictorial conventions of ancient reliefs by examining classical friezes such as those on the Arch of Constantine. He also studied modern fresco cycles that Polidoro da Caravaggio and Baldassare Peruzzi painted on the façades of Roman houses before the Sack of 1527, which transformed stucco walls into *all'antica* narrative paintings.³⁶ Assimilating this pictorial syntax to his personal style,

33 E.H. Wouk, 'Reclaiming the Antiquities of Gaul: Lambert Lombard and the History of Northern Art,' *Simiolus* 36 (2012), 35–65, esp. 44. On the 'documentary' value of Floris's drawings of antiquities, see R. Stucky, 'Frans Floris' Baseler Skizzen und das Problem der Antikenergänzung im mittleren 16. Jahrhundert,' in *Antikenzeichnung und Antikenstudium in Renaissance und Frühbarock*, ed. R. Harprath and H. Wrede (Mainz am Rhein: Verlag Philipp von Zabern, 1989), 215–20.

34 Bialler, *Chiaroscuro Woodcuts*, 34–37, acknowledging an earlier mention by Ger Luijten. See also Wouk, *Uno stupore*, lv–lvi, xcii–xciii.

35 Ibid., esp. xlix–lvii.

36 See Hall, *After Raphael*, 73–78. Although hunts occur frequently in these friezes, the combination of a bear hunt and a bull hunt is exceptional. On Floris's studies of Roman frescoes, see E. Wouk, 'Frans Floris and the Followers of Raphael,' in *Culture figurative e confronto tra Fiandre e Italia dal xv al xvii secolo* (Milan: Silvana, 2008), 127–35. For his drawing after the Arch of Constantine, see Wouk, *Uno stupore*, lvii, fig. 19.

32 P. Bober and R. Rubinstein, *Renaissance Artists and Antique Sculpture: A Handbook of Sources* (New York and London: Oxford University Press, 1986), 61–62, no. 16.

Floris turned away from earlier monumental prints in the North, including Coecke's *Ces Moeurs et Fachons de Faire des Turcz* (1553), which recall the conventions of tapestry design.³⁷ Instead his woodcuts and the *Hunts* in particular celebrate the modern, relief-like idiom of contemporary Italian art. Hung on a wall, the *Hunts* might have functioned as an ephemeral, interior substitute on a reduced scale for those Roman frescoes, projecting the erudite aspirations of those able to afford them.

Nancy Bialler noted that Floris was the first Netherlandish artist to design chiaroscuro woodcuts with interdependent blocks in a manner directly inspired by the precedents of Italian pioneers, especially Ugo da Carpi, Antonio da Trento and Niccolò Vicentino.³⁸ Vasari disparaged Ugo's skills as a painter but credited him with the invention of the chiaroscuro woodcut using three tone blocks: 'he used woodblocks in three tones, the first made the shadows, the second, which was of a lighter tint, provided a middle tone, and the third block, carved deeply, gave the lighter ground tone, and left the white of the paper to create highlights'.³⁹ Floris's chiaroscuro

woodcuts function similarly, leading Oberhuber to propose a close connection between Gietleughen and Niccolò, a printmaker known only through Vasari's reference to prints he made after Parmigianino's designs.⁴⁰ While this comparison may not stand up to the most recent analyses of Vicentino's working method,⁴¹ it remains useful in questioning how Floris and his block cutter conceptualised these prints in relation to recent Italian print examples, in which technical advances, such as reliance on the middle tone, emphasised volume and created a sense of monumentality.

Floris did not, as far as we know, produce designs for 'traditional' woodcuts.⁴² It thus stands to reason that he was attracted to chiaroscuro design because he believed that colour printing could be an effective vehicle for translating his *all'antica* style in print and advertising his knowledge of ancient and Renaissance art to an increasingly sophisticated public. Although we are still uncertain about how the tones in Floris's prints have degraded, it is worth considering if the palettes evoke Floris's sources. *David Playing the Harp* is known in browns, ochres, greens, reds and greys, all similar in value to the colours used in contemporary Roman fresco cycles.⁴³ The frieze-like panorama of the *Hunts* is recorded in greens and browns, which befit the sylvan setting and recall the properties of the exterior Italian fresco cycles that emulated stone or bronze reliefs. Indeed, when Italian printmakers such as Vicentino treated these frescoes for an Italian audience familiar with the monuments, they (or their printers) chose the same palettes.⁴⁴

As portable objects, then, Floris's woodcuts call to mind his monumental models as well as the intimate media that chiaroscuro woodcuts could resemble: wash drawings, red

37 G. Marlier, *Pierre Coeck d'Alost: La Renaissance flamande* (Brussels: Finck, 1966), 55–74. See also *Grand Scale: Monumental Prints in the Age of Dürer and Titian*, ed. L. Silver and E. Wyckoff, exh. cat. (New Haven: Yale University Press, 2008), 148–49, 167, no. 38. It is generally agreed that the prints were made after earlier tapestry designs. G. Necipoglu, 'Süleyman the Magnificent and the Representation of Power in the Context of Ottoman-Hapsburg Rivalry', *Art Bulletin* 71 (1989): 401–27, esp. 419–20, argues that Coecke hoped the Sultan would order tapestries to rival those commissioned by the Hapsburgs, such as recent cycles designed by Bernaert van Orley, possibly with Coecke's involvement, especially the *Hunts of Maximilian*; see I. Buchanan, 'Invasion of the French Camp and the Flight of the Women and Civilians', in T.P. Campbell, ed., *Tapestry in the Renaissance: Art and Magnificence*, exh. cat. (New York: Metropolitan Museum of Art, 2002), 321–39, no. 36, and also 251–52, 278.

38 Bialler, *Chiaroscuro Woodcuts*, 24–25.

39 G. Vasari, *Le vite de' più eccellenti pittori scultori ed architettori...*, ed. G. Milanesi, 9 vols. (Florence: Sansoni, 1878–85) 5: 420–21: 'Ugo da Carpi, il quale, sebbene fu mediocre pittore, fu nondimeno in altre fantasticherie d'acutissimo ingegno. Costui dico...fu quegli che primo si provò, e gli riuscì felicemente, a fare con due sampe, una delle quali a uso di rame gli serviva a tratteggiare l'ombra e con l'altra faceva la tinta del colore, perchè graffiava in dentro con l'intaglio, e lasciava i lumi della carta in modo bianchi, che pareva, quando era stampata, lumeggiata di biacca. La qual cosa essendogli riuscita, presso animo, tentò Ugo di far carte con stampe di legno di tre tinte: la prima faceva l'ombra, l'altra, che era una tinta di colore più dolce, faceva un mezzo, e la terza graffiata faceva la tinta del campo più chiara ed i lumi della carta bianchi'. See L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume,

124–27. See also N. Blackwood, 'Printmaker as Painter: Looking Closely at Ugo da Carpi's *Saint Veronica Altarpiece*', *Oxford Art Journal* 36 (2013), 167–84, who proves that the *Veronica* painting is, in fact, a woodcut print.

40 Oberhuber, *Zwischen Renaissance und Barock*, 101. On Vicentino, see Vasari, *Le vite*, 5: 423; A.E. Popham, 'Observations on Parmigianino's Designs for Chiaroscuro Woodcuts', in *Miscellanea I.Q. van Regteren Altena* (Amsterdam: Scheltema & Holkema, 1969), 48–51; Landau and Parshall, *Renaissance Print*, 157–59.

41 N. Takahatake, 'Niccolò Vicentino's "Miraculous Draught of Fishes"', *Print Quarterly* 28.3 (2011), 256–60.

42 NH-DF Floris 2: 188–89, no. 157.

43 T. McGrath, 'Color and the Exchange of Ideas between Patron and Artist in Renaissance Italy', *Art Bulletin* 82 (2000), 298–308, esp. 301–02.

44 Cf. Vicentino's chiaroscuro woodcut *Ajax*, after Polidoro da Caravaggio; Bartsch XII.12.99.9.

chalk drawings, even small oil paintings.⁴⁵ No drawings for Floris's extant chiaroscuro woodcuts survive, but it has been argued that sets of his drawings representing the *Story of Joseph* and *Story of Phaeton* are the remnants of unexecuted cycles of chiaroscuro woodcuts.⁴⁶ The green palette, the use of wash in large areas suggestive of a tone block and the extensive highlights from the paper are similar to those in Floris's chiaroscuro woodcuts. The treatment of figures is very close to that in the three colour prints of 1555, suggesting that these projects date to the same time but were never printed.⁴⁷ A surviving impression of the *David Playing the Harp* on linen in the Lugt collection in Paris, however, demonstrates that Floris's woodcuts were printed on cloth and varnished like small paintings.⁴⁸

The Bibliothèque nationale de France owns a chiaroscuro woodcut of a female head representing a *Dryad* (Fig. 13.5) with woodblocks cut in a manner so similar to *David Playing the Harp* and the *Hunts* that it may also be attributed to Gietleughen.⁴⁹ The unique impression is so damaged that the signature or address, if there were one, has been lost. Yet comparison with a later engraving by Cornelis Cort of a *Dryad* from the series of *Goddesses of Land*, engraved in 1564, confirms Floris's authorship of the design.⁵⁰ This life-size print represents the head against a blank field in the same manner as the dozens of small oil paintings Floris produced in which he studied diverse character types, emotions and historiated figures for use



FIGURE 13.5 Joos Gietleughen, after Frans Floris de Vriendt, Head of a Dryad, c.1555 (?), chiaroscuro woodcut from four blocks, 34.8 × 24.9 cm

PARIS, BIBLIOTHÈQUE NATIONALE DE FRANCE, CABINET DES ESTAMPES, CC-100A RÉS. FOL; FORMERLY CC-6-FOL; BY PERMISSION OF THE BIBLIOTHÈQUE NATIONALE DE FRANCE

45 Floris's masterful *Mucius Scaevola* in red chalk survives (Vienna, Albertina, inv. 15.121); see C. van de Velde, *Frans Floris (1519/20–1570): Leven en werken*, 2 vols. (Brussels: Paleis der Academiën, 1975), 1: 382, no. T50; 2: fig. 149.

46 Bialler, *Chiaroscuro Woodcuts*, 35–36. See drawings in the Cabinet des Estampes, Bibliothèque royale, Brussels, inv. F 3904, the Grapische Sammlung, Munich, inv. 7008, and the Musées royaux des Beaux-Arts, Brussels, Coll. de Grez, inv. 3699; see Van de Velde, *Frans Floris*, 1: 371–72, no. T37, 375–77, nos. T42–43; 2: figs. 137, 141–42.

47 Miedema, *Karel van Mander*, 216–17 (fol. 239^v), records that Floris's pupils 'got hold of his drawings' after Michelangelo 'and printed them off', although the verb he uses, *afghedrukte*, may refer to the pulling of counterproofs, i.e. making *Abklatsche*, or copies produced by moistening and offsetting drawings. See Stijnman, *Engraving and Etching*, 321.

48 H. Buijs, ed., *Un cabinet particulier: les Estampes de la collection Frits Lugt* (Paris: Institut néerlandais, 2010), 52–54, no. 5, with bibliography; N. Bialler, 'Schilderachtige Prenten (Picturesque Prints)', in *Essays in Northern European Art Presented to Egbert Haverkamp-Begemann on his 60th Birthday*, ed. A.M.S. Logan (Doornspijk: Davaco, 1983), 33–37.

49 NF-DF Floris 1: 16, no. 8.

50 Ibid., 2: 91, no. 106.

in his compositions.⁵¹ While Van Mander ascribes these head studies a utilitarian function in the studio, contemporary inventories reveal that they were collected as independent works from an early date. Matt Kavalier has correctly described this phenomenon as a reflection of the self-conscious artistic culture of Antwerp, where these 'studies' were appreciated for their authorship, not their preparatory value.⁵² Inventories further reveal that some were identified as representing allegorical or historical figures like Ceres, Bacchus and Roman emperors, while others were simply termed heads or '*tronies*'.⁵³ Recent

51 J. Müller Hofstede 'Zur Kopfstudie im Werke von Rubens', *Wallraf-Richartz-Jahrbuch* 30 (1968), 225–347.

52 Miedema, *Karel Van Mander*, 229 (fol. 242^v). See E. Matt Kavalier, *Pieter Bruegel: Parables of Order and Enterprise* (Cambridge and New York: Cambridge University Press, 1999), 48–54.

53 See L. Smolderen, 'Tableaux de Jérôme Bosch, de Pierre Bruegel l'Ancien et de Frans Floris dispersés en vente publique à

analyses have demonstrated that some were painted on paper and only later mounted on panel supports.⁵⁴ It is possible that some were in fact prints like the *Head of a Dryad* that have been lost over time.

Some etchings after Floris's designs were printed with a woodcut tone block to evoke wash drawings, including a series of the *Four Meals of Christ*⁵⁵ and a large *Washing of the Apostles' Feet*.⁵⁶ The former attribution of these etched plates to Floris's long-time pupil Crispijn van den Broeck has not been upheld in recent literature, although the matter warrants reconsideration.⁵⁷ It is worth noting that Goltzius, a pioneer of this mixed technique, was well acquainted with Van den Broeck. He lent him his house and its contents for two years starting in 1558, just after the completion of the *Imperatorum Imagines*, and may have encouraged him to make prints.⁵⁸ The combination of etching and relief may respond to earlier experiments by Beccafumi and Parmigianino or to Goltzius's immediate example. As in the case of earlier experiments with the mixed-technique, printing Floris's combined etchings and woodcuts in both a relief press and a rolling press proved difficult.⁵⁹ Consequently Floris's prints suffered a fate similar to that of their possible technical models: the tone blocks were eventually abandoned and the prints were published as etchings, with areas where the block had previously provided tone now filled in with additional etched lines.⁶⁰

A Discourse on Colour

Floris's engagement with colour woodcuts seems to have ended abruptly. Cost, the availability of a press and colour

inks, lack of adequate sales and the technical complexities of printing may have discouraged him. Yet examining these experimental sheets in light of his designs for engravings brings another explanation. Whereas before 1555, nearly all of his engravings were made after large, multi-figure history paintings, after 1555 he produced drawings that were independent of his paintings and made expressly for engraving. This shift was prompted, at least in part, by Floris's close and productive relationship with Cornelis Cort. An engraver of unrivalled skill, Cort translated Floris's fluid designs into sophisticated engravings through control of the burin, using swelling contours and sweeping curves to produce tonal effects that had eluded earlier printmakers. In broad terms, the end of Floris's engagement with chiaroscuro woodcut corresponds with a shift from reproductive prints to autonomous prints.⁶¹

Goltzius, for his part, did not return to the mixed intaglio-relief approach. Instead, the numismatic treatises published from his press in Bruges include lavish plates filled with smaller representations of ancient coins. Etched in greater detail than the plates in the *Imperatorum imagines* and closer in size to actual coins, they purported to represent the precise variations of separate issues of a given coin, rather than the dazzling effect of a single, large medallion. As a result they came to resemble the images in other numismatic treatises, such as the large engraved plates representing the reverses of coins in Enea Vico's study of Roman Emperors of 1548, which had brought numismatics to the discipline of history.⁶² The letters Goltzius sent to Ortelius – vivid testaments to their sustained friendship – intersperse personal information with questions that reflect new concerns about how best to represent his findings visually.⁶³ Producing the *Imperatorum imagines* had revealed the difficulty of any attempt to replicate colours faithfully in print. Even if printing the detailed etchings in Goltzius's later publications with colours had been possible, it would have detracted from their evidentiary value.⁶⁴ His new, etched representations of coins soon attracted the attention of a younger generation of humanists, including the humanist and philologist Justus Lipsius, who lauded the publication of the *Fasti*, praising Goltzius in equal measure for his diligence in

la monnaie d'Anvers en 1572', *Revue belge d'archéologie et d'histoire de l'art* 64 (1995), 33–41.

54 Two head studies painted in oil on paper are known: Dresden, Kupferstichkabinett, inv. 1967-52, 172 × 153 mm. See C. Dittrich, *Van Eyck, Bruegel, Rembrandt: Niederländische Zeichnungen des 15. bis 17. Jahrhunderts aus dem Kupferstich-Kabinett Dresden* (Eurasberg: Minerva, 1997), 56–57, no. 19; the head appears in Floris's St. Petersburg *Judgment of Paris*. Another head painted on paper was sold in 1998; *Exhibition of Old Master Drawings*, sales cat. (New York: Colnaghi, May–June 1998), no. 8.

55 NF-DF Floris 1: 6–11, nos. 2–5.

56 Ibid., 1: 12–13, no. 6.

57 U. Mielke, *Crispijn van den Broeck*, ed. Ger Luijten, 2 vols., NH-DF (Ouderkerk aan den IJssel: Sound and Vision, 2011) 2: 194, nos. R2–3.

58 Document published by Weale, *Hubert Goltz dit Goltzius*, 254–57.

59 C. Hartley, 'Beccafumi "Glum and Gloomy"', *Print Quarterly* 8 (1991), 418–25; Landau and Parshall, *Renaissance Print*, 274.

60 Incidentally, it was only at this point that Floris's signature was added to the plates.

61 Wouk, *Uno stupore*, lxi–lxiii.

62 E. Vico, *Le Imagini con tutti i riversi trovati et le vite de gli Imperatori tratte dalle medaglie et dalle historie de gli antichi* ([Parma]: Enea Vico, 1548); see Haskell, *History and its Images*, 16.

63 Letters dated 1570, 1574 and 1581; see Dekesel, *Abraham Ortelius*, 187–90. Their friendship is further attested to by the prominent place Ortelius accorded Goltzius in his *Album amicorum*; see Puraye, *Album*, fol. 25^v.

64 Catalogued in Le Loup, *Hubert Goltzius*, 47–50.

seeking out rare coins and his skill at representing them in print.⁶⁵

Lipsius's comments echo the terms of a slightly earlier critical discourse on Northern printmaking found in the publications and correspondence of his friend Dominicus Lampsonius, who valorised the independent status of the print and reinvigorated the aesthetic of the black and white burin engraving.⁶⁶ A tireless promoter of Cort, Lampsonius invoked Albrecht Dürer's engravings as evidence of the historic excellence of Northern artists as printmakers. Lampsonius appears to have agreed with Erasmus, who warned, 'if you would spread on pigments you would injure the work'.⁶⁷ Yet rather than caution against colouring printed images, Lampsonius focused on the matrix itself, contending that Cort's expert handling of the burin could render properties of tone and colour of an artist's designs, translating the inventor's *disegno*, *maniera* and *colorito* from the fluid medium of drawing to the linear medium of burin engraving. In his well-known letter to Titian, Lampsonius addresses the matter directly, explaining that Cort's approach to tone enabled him to 'imitate and express' the colouristic values of the painter's personal style to a degree unmatched by any of his immediate predecessors or contemporaries, Northern or Italian, so that in the black and white medium of engraving Titian's colours would appear 'not only natural, but also somehow divine, august, and immortal!'⁶⁸

When Lampsonius made these astounding assertions, Cort had recently completed his final engravings for Floris, a cycle of *The Story of Pluto and Proserpina* from Ovid's *Metamorphoses*.⁶⁹ The extant studies for those prints certainly resemble the very sort of drawing Floris would have prepared for his chiaroscuro woodcuts, executed in three vibrant tones of blue-green washes applied in broad

strokes over an earlier pen-and-ink drawing on prepared paper. But those drawings actually served as the basis for the finest and most tonal engravings Cort produced before leaving for Italy, dazzlingly rich illustrations of Pluto's conquest and its aftermath including the weeping *Cyane* (Fig. 13.6). This highly tonal print thematises transformation—of finite humanity into eternal nature and of base copper into a surface capable of rendering form, volume and even the properties of colour in engraved black lines.⁷⁰ Floris's brief experiment with chiaroscuro woodcut design yielded impressive results, but was, perhaps, precocious. The triumph of the chiaroscuro print in the North would have to await a new generation, when Goltzius's nephew Hendrick would give the technique new prominence alongside his celebrated burin engravings.⁷¹



FIGURE 13.6 Cornelis Cort, after Frans Floris, *Cyane*, 1565, engraving, 22.6 × 20.2 cm
AMSTERDAM, RIJKSMUSEUM, RP-P-1983-160; © THE RIJKSMUSEUM

65 See his letter of 1577, quoted in J. Papy, 'An Antiquarian Scholar between Text and Image? Justus Lipsius, Humanist Education, and the Visualization of Ancient Rome', *Sixteenth Century Journal* 35 (2004), 97–131, 117–18.

66 J. Puraye, *Dominique Lampson, humaniste* (Bruges: Desclée de Brouwer, 1950), 55–56.

67 As quoted in E. Panofsky, *The Life and Art of Albrecht Dürer*, 2 vols. (Princeton: Princeton University Press, 1948) 1: 140.

68 Letter of 13 March 1567, written after receipt of Cort's earliest prints after Titian; see J.W. Gaye, *Carteggio inedito d'artisti dei secoli XIV, XV, XVI*, 3 vols. (Florence: Molini, 1839–40) 3: 243: '*nel saper veramente veramente imitar et esprimere il vivo et le sue bellezze, a tale che i vostri colori pareno non già solamente naturale, ma anco non so che di più divino, augusto et immortale!*'

69 Ovid, *Metamorphoses*, V, 365–68; 419–30. Ovid: *Metamorphoses*. 1: *Books I–VII*, trans. F.J. Miller, rev. G.P. Goold (3rd ed., Cambridge, MA and London: Harvard University Press, 1977): 263–69.

70 NH-DF Floris 2: 42–48, nos. 79–82. For the drawings, Wouk, *Uno stupore*, lxiv–lxvii, figs. 24–25. For the narrative, see Ovid, *Metamorphoses*, V, 425–39: 269.

71 For these prints, see M. Leesberg, *Hendrick Goltzius*, ed. H. Leeftang, 4 vols., NH-DF (Ouderkerk aan den IJssel: Sound and Vision, 2011); M. Leesberg, 'Hendrick Goltzius's Chiaroscuro Woodcuts', this volume, 163–71.

PART 4

Vivid Mannerism, c.1588–1650

∴

Hendrick Goltzius's Chiaroscuro Woodcuts Revisited

Marjolein Leesberg

The woodcuts made by the virtuoso artist Hendrick Goltzius were thoroughly researched and described by Nancy Bialler in her 1983 PhD dissertation and catalogue for the 1992–93 exhibition on the subject.¹ Although her work remains authoritative, recent research by the present author on all prints by and after Goltzius raises the opportunity to call renewed attention to his chiaroscuro woodcuts and to revisit some issues concerning Goltzius's role and aim in their production.² The present chapter addresses their experimental nature and the still undecided question of whether he cut the blocks himself. Goltzius's use of grey tones in the series of the *Deities*, aiming to reproduce pen and wash drawings, will be re-examined versus later impressions that were printed, probably posthumously, in bright colours that did not reflect Goltzius's intentions. Finally, two unique impressions of intaglio prints with a woodcut tone block, one of which was not located by previous authors, will be discussed.

Goltzius was the most versatile Dutch printmaker of the late sixteenth century. In 1577 he followed his teacher Dirck Volckertsz. Coornhert from the Rhineland to Haarlem, where the young artist started a publishing firm in 1582. By the late 1580s it had developed into a thriving workshop where Goltzius engraved many plates himself and his pupils and assistants engraved plates after his designs. Goltzius also produced about eighteen woodcuts, nearly all of which were at some point printed with additional tone blocks. However, he conceived of only eleven as chiaroscuro woodcuts, all of which are datable to a very short period of time, 1588–90.³ This moment marks a fascinating phase in Goltzius's career. It is well known

that, around 1585, he had been introduced to drawings by Bartholomeus Spranger, the Flemish artist who worked from 1581 as court painter for Rudolf II in Prague. Spranger's mannered style, based on his years in Italy (1565–75), had a huge impact on Goltzius's style and technique.⁴ During the following years he honed his virtuoso engraving technique of the swelling curve. At the same time, he became more interested in working with tone in his drawings, shifting his emphasis away from the treatment of line.⁵ The earliest of his portraits in coloured chalk is that of *Gillis van Breen* (dated 1588).⁶ He also experimented with pen and wash drawings with white heightening on a coloured prepared ground, influenced by Spranger. The chiaroscuro effects in these drawings and woodcuts, which he started making around this time, demonstrate Goltzius's concern with tone, light and shadow.⁷

When Goltzius began making chiaroscuro woodcuts, only a few had been produced in the Netherlands, all two

Four Landscapes (nos. 307–10) and *Standing Young Man* (no. 306), datable to the later 1590s, were published by Goltzius as line blocks only on blue paper, with heightening and his monogram added in white by hand. The tone blocks were added at a later date. A number of woodcuts, formerly attributed to Goltzius, were rejected. For rejections see NH-DF Goltzius 4: 241–42, no. D3, 300–07, nos. R48–53. The dating of the chiaroscuro woodcuts after Bialler was maintained; on the historiography of this dating, see Bialler, *Chiaroscuro Woodcuts*, 78–79.

- 1 N.A. Bialler, *Hendrick Goltzius and the Netherlandish Chiaroscuro Woodcut*, 2 vols. (PhD diss., Yale University, New Haven, 1983); N.A. Bialler, *Chiaroscuro Woodcuts: Hendrick Goltzius (1558–1617) and His Time*, exh. cat. (Amsterdam: Rijksmuseum; Ghent: Snoeck-Ducaju, 1992).
- 2 M. Leesberg, *Hendrick Goltzius*, ed. H. Leeftang, 4 vols., NH-DF (Ouderkerk aan den IJssel: Sound & Vision, 2012).
- 3 Bialler, *Chiaroscuro Woodcuts*, 87–155, nos. 22–34, 173–91, nos. 49–53; NH-DF Goltzius 1: l–lii, 2: 190–243, nos. 293–310. The chiaroscuro woodcuts are the series of *Demogorgon and the Deities* (nos. 294–300), *Bacchus and Mars* (nos. 301–02), *Mars in Half-length* (no. 303) and *Hercules Killing Cacus* (no. 304). The early woodcuts of *Mary Magdalen* (no. 293) and *Gillis van Breen* (no. 305), as well as the

- 4 N.M. Orenstein, 'Finally Spranger: Prints and Print Designs 1586–1590', in H. Leeftang and G. Luijten, eds, *Hendrick Goltzius (1558–1617): Drawings, Prints and Paintings* (Zwolle, Amsterdam, New York, Toledo, Ohio: Waanders, Rijksmuseum, Metropolitan Museum of Art, Museum of Art, 2003), 81–115.
- 5 Bialler, *Chiaroscuro Woodcuts*, 80–81.
- 6 Frankfurt a.M., Städel Museum, 807; M. Schapelhouman, 'Drawing the Likeness of the Most Renowned with the Chalks', in Leeftang and Luijten, eds, *Hendrick Goltzius*, 148, 152–53, no. 47.
- 7 See Y. Bleyerveld on the drawing of a *Sacrificial Scene*, c.1588, in Rotterdam, Boijmans Van Beuningen, MB 333 recto (PK); Y. Bleyerveld, et al., *Nederlandse tekeningen uit de vijftiende en zestiende eeuw in Museum Boijmans Van Beuningen, Rotterdam: Kunstenaars geboren voor 1581* (Rotterdam: Museum Boijmans Van Beuningen, 2012). Search: <http://collectie.boijmans.nl/nl/onderzoek/nederlandse-tekeningen-15e-16e-eeuw/colofon/> (accessed 5 May 2015).

to three decades previously.⁸ He was influenced mostly by the chiaroscuro woodcuts from the mid-sixteenth century of Frans Floris and his school.⁹ Floris had looked closely at Italian chiaroscuro woodcuts by Ugo da Carpi and Antonio da Trento after Parmigianino.¹⁰ Goltzius, in turn, was also inspired directly by these Italian examples. In one of his earliest engravings of his own designs, *Ruth Gleaning Grain in the Fields of Boaz* (1576), he seems to have derived the figure of Boaz from a chiaroscuro woodcut by Ugo da Carpi after Parmigianino.¹¹

Spranger may also have inspired the artist to experiment with chiaroscuro woodcuts. According to his biography in Van Mander's *Schilder-boeck* of 1604, Spranger practised the use of highlight and shadow in his drawings by 'copying the [chiaroscuro] prints of Parmigianino and Floris on blue paper for the sake of liveliness'.¹² Goltzius not only followed Spranger in making pen and wash drawings on a coloured ground; his keen interest in all aspects of printing techniques must have made him eager to try turning them into chiaroscuro prints like those Spranger had taken as an example.¹³ It seems significant in this regard that Van Mander specifically mentioned Spranger's use of blue paper, since Goltzius's earliest woodcuts were printed solely on blue paper, possibly to create a similar effect.

Cutting the Blocks

The brevity of Goltzius's engagement with chiaroscuro woodcuts is an indication of the experimental nature of his endeavour, which involved independent and interdependent key blocks combined with one or two tone blocks

in different palettes. Producing these blocks would have required a highly skilled blockcutter. The question of whether Goltzius himself was this woodcutter has remained unanswered.¹⁴ However, a number of factors make it plausible that Goltzius did cut the blocks for his own chiaroscuro woodcuts.

It is well known that master engravers such as Albrecht Dürer and Lucas van Leyden, both greatly admired by Goltzius, made use of professional blockcutters (*Formschneider*) for their woodcuts. In the 1580s, no professional woodcutters were active in Haarlem, and none in the Northern Netherlands could have been proficient in making chiaroscuro woodcuts because so few had ever been produced there and none had been produced recently. Although it cannot be entirely ruled out that Goltzius did make use of a blockcutter for cutting his key blocks, he would have had to work very closely with the blockcutter in the presumably time-consuming process of making the tone blocks and coordinating them with the key block. It seems hard to imagine that Goltzius would not have tried his hand at cutting the blocks himself, given his great versatility as an engraver and love of experiment.

He may well have been instructed in woodcutting by his teacher Dirck Volckertsz. Coornhert. The latter started his career as a printmaker in 1547 by cutting the design for a lottery bill in wood after Maarten van Heemskerck. No impressions are preserved because the lottery was called off. However, the commission was fully described in the Haarlem Treasurer's Account, which reveals that Heemskerck made a preparatory design in pen on paper and then a detailed drawing directly on the block, which was cut by Coornhert.¹⁵ Several other woodcuts after Heemskerck have been attributed to Coornhert, who did not sign his early prints.¹⁶

A clear development can be traced in Goltzius's woodcuts, which gradually moved away from the graphic conventions of copper engraving and from independent to interdependent key and tone blocks. This technical and artistic evolution is best illustrated by the *Deities* (c.1588–90), a series of seven oval designs, starting with Demogorgon as creator of the world and followed by three

8 See Bialler, *Chiaroscuro Woodcuts*, 24–77.

9 Ibid., p. 25. On Frans Floris' chiaroscuro woodcuts, see E. Wouk, *Frans Floris*, 2 vols., NH-DF (Ouderkerk aan den IJssel: Sound & Vision, 2011) 1: liv–lviii, 2–26, nos. 1–9; see E. Wouk, "Divine, August and Immortal", this volume, 151–60.

10 NH-DF Floris 1: lv. On their work, see L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 124–30.

11 H. Leeftang, 'Various Manners of the Best Masters', in Leeftang and Luijten, eds, *Hendrick Goltzius*, 35, figs. 20–21. NH-DF Goltzius 1: 8, no. 4.

12 K. van Mander, *Het Schilder-Boeck* (Haarlem: Wesbusch, 1604), fol. 269^r, lines 25–27; H. Miedema, *The Lives of the Illustrious Netherlandish and German Painters, from the First Edition of the Schilder-Boeck (1603–1604)*, 6 vols. (Doornspijk: Davaco, 1994–99) 1: 334–35, 5: 90–91.

13 Bialler stresses that Van Mander 'never suggests that Spranger's brush drawings may have stimulated Goltzius to make chiaroscuro woodcuts'; Bialler, *Chiaroscuro Woodcuts*, 15, n.1. However, Van Mander made no mention of Goltzius's chiaroscuro woodcuts.

14 Ibid., 78; in NH-DF Goltzius the woodcuts are included as autograph works (see note 3). See also NH-DF Goltzius 1: li.

15 I.M. Veldman, *Maarten van Heemskerck and Dutch Humanism in the Sixteenth Century* (Maarssen: Schwartz, 1977), 55; I.M. Veldman, *Maarten van Heemskerck*, ed. G. Luijten, 2 vols., NH-DF (Roosendaal: Koninklijke Van Poll, 1993–94), 1: 11. Noord-Hollands Archief Haarlem, *Thesauriersrekeningen 1547*, fol. 94; ed. B. Becker, *Bronnen tot de kennis van het leven en werken van D.V. Coornhert* (The Hague: Nijhoff, 1928), 4–5, no. 4.

16 NH-DF Heemskerck 1: 157–62, nos. 183–88, 2: 62–65, nos. 356–59, 77, no. 372; four woodcuts bear the monogram 'MvH'.

pairs of gods: Oceanus and Tethys ruling the seas, Pluto and Proserpina ruling the underworld, and Helios and Nox ruling the heavens.¹⁷ In the earliest datable print, *Demogorgon in the Cave of Eternity* (c.1588), the key block is dominant and uses extensive (black line) cross-hatching to indicate shadows.¹⁸ Demogorgon's body is made up of a multitude of different kinds of lines: long and short hatchings, circular lines, hooks and dots. The two tone blocks add shadows and highlights, and Goltzius's signature is cut out from the dark tone block. In comparison, in one of the later prints from the series, *Oceanus* (c.1590), the key block and tone blocks are completely integrated and thus interdependent. In the key block, the lines are more regular. The forms are partially outlined in all three blocks (which thus must be printed together to create the image), and the tone blocks completely carry the background figures and sky.

Goltzius signed all the prints of the *Deities* with his monogram and 'F' or 'fe' for *fecit* (he made it). He signed several of his autograph copper engravings and drawings during these years in the same way. *Apollo* (1588), an engraving of comparable measurements and style to the *Deities*, is signed *HG. fe.*, as are the deities *Tethys*, *Pluto* and *Helios*.¹⁹ Furthermore, his drawing of a *Standing Female Nude* (c.1586–90) also bears this signature.²⁰ It seems significant that he used the same signature on his chiaroscuro woodcuts. An exception, however, is his most ambitious chiaroscuro woodcut, *Hercules Killing Cacus* (1588), signed and dated in the dark tone block with *HGoltzius Inve[ntor]*, a signature that was usually followed by *et sculpsit* ('and he cut it') on his autograph engravings. It thus might be argued that the design was drawn by Goltzius on the block and cut out by someone else. However, a unique impression of just the light tone block reveals that the white areas are intricately cut out and aligned, complementing the composition with highlights, so the artistic process of its creation goes much further than anything that another blockcutter working at that time in Holland could have carried out (Fig. 14.1).

Printing the Blocks

Goltzius must have been familiar with Vasari's description of Ugo da Carpi's chiaroscuro woodcuts as reproductions of drawings in pen and wash.²¹ In the *Deities*, Goltzius imitated the pen and brush drawings, heightened with white, that he produced at the same time in similar grey and tan colours with a similar use of lighter tones for the background scenes.²² The number of impressions traced in these muted colours is very limited. They show signs of being printed by a printer unfamiliar with the technique of making an impression using three different blocks, i.e. a key block and two tone blocks.²³ In most impressions the key block and tone blocks are misregistered, and the blocks seem insufficiently inked, resulting in a granular appearance of the tone blocks. In one chiaroscuro impression of *Mars in Half-length*, the tone block in grey was printed over the key block, indicating unfamiliarity with the process (Fig. 14.2). This may thus be one of the earliest impressions.

Whereas Goltzius owned a roller press for intaglio printing, it is unlikely that he also had a typographic press, which was necessary for printing woodcuts. During the late 1580s, when he made his woodcuts, Goltzius employed a professional printer for his engravings, who supervised the printing process of his output; Van Mander mentions that Goltzius left 'various pupils and the printer at home' when he left for his trip to Italy in 1590.²⁴ The only printer in Haarlem with a relief or typographic press in 1585–90 was Gillis Rooman. This Flemish printer from Ghent married the widow of the Haarlem printer Antonis Ketel, who had died in 1583, and led the firm from 1584.²⁵ Goltzius may have experimented with the printing process of his chiaroscuro woodcuts himself or at Rooman's printing firm, probably closely supervising the printer who was as inexperienced with the technique as Goltzius was himself.²⁶ Inexperience and experimentation may explain

17 Bialler, *Chiaroscuro Woodcuts*, 115–46. See for the complex iconography: H.E.C. Mazur-Contamine, 'Goltzius's Seven Oval Chiaroscuro Woodcuts – A Reinterpretation', *Delineavit et Sculpsit* 12 (1994), 1–45.

18 The cutting technique used for these blocks, which is different from that used for later blocks, may reinforce an attribution to Goltzius.

19 NH-DF Goltzius 1: 250–51, no. 151.

20 Amsterdam, Rijksmuseum, RP-T-1949-540; E.K.J. Reznicek, *Die Zeichnungen von Hendrick Goltzius* (2 vols., Utrecht: Haentjens, Dekker & Gumbert, 1961), 1: 267, no. 98.

21 G. Vasari, *Le vite de' più eccellenti pittori scultori ed architettori*, 3 vols. (Florence: Giunti, 1568) 2: 303; NH-DF Goltzius 1: li.

22 For instance the preparatory drawings for the four *Old Testament Heroes and Heroines*, c.1588: Amsterdam, Rijksmuseum, RP-T-1900-537–40; NH-DF Goltzius 1: liv–lv, figs. 4–5, 3: nos. 400–03.

23 See L. Morenus, 'Chiaroscuro Woodcut Printmaking', this volume, 123–24.

24 Van Mander, *Schilder-Boeck*, fol. 282^v, lines 36–37. On the identification of Gillis van Breen as Goltzius's printer, see NH-DF Goltzius 1: liii, lvi.

25 H.J. Laceulle-van de Kerk, *De Haarlemse drukkers en boekverkopers van 1540 tot 1600* (The Hague: Nijhoff, 1951), 88–99.

26 The adaptation of a roller press for book printing was advocated in the eighteenth century by Jean Michel Papillon; see J.M. Papillon, *Traité historique et pratique de la gravure en bois*, 2 vols. (Paris: Simon, 1766) 2: 368. I thank Ad Stijnman for pointing this out to



FIGURE. 14.1 *Hendrick Goltzius, Hercules Killing Cacus, 1588, chiaroscuro woodcut, proof-impression of light tone block in tan, 41.0 × 33.2 cm*
 AMSTERDAM, RIJKSMUSEUM, RIJKSPRENTENKABINET, RP-P-1878-A-933 VERSO; © THE RIJKSMUSEUM



FIGURE. 14.2 *Hendrick Goltzius, Mars in Half-length, c.1588, chiaroscuro woodcut from two blocks in black/grey, 24.5 × 17.6 cm*
AMSTERDAM, RIJKSMUSEUM, RIJKSPRENTENKABINET,
RP-P-OB-10.306; © THE RIJKSMUSEUM

the imperfections of the early impressions of his chiaroscuro woodcuts and possibly even the splitting of the block of the *Portrait of Gillis van Breen*.

Early vs. Late Palettes

Few impressions of the *Deities* are known in a muted palette, but many tan/green and ochre/brown impressions survive.²⁷ They are all later impressions that show

deterioration of the blocks with wormholes, gaps in the borderlines and cracks in the blocks. As Bialler has already suggested, the most likely candidate for the printing and publishing of these later impressions in a much brighter palette was Willem Janssen, the famous publisher and cartographer better known as Willem Jansz. Blaeu, who worked in Amsterdam during the early seventeenth century.²⁸

The early seventeenth century witnessed the 'Dürer Renaissance' and a revival of the chiaroscuro woodcut in Holland, in which Janssen played an important role. He acquired two original Dürer woodblocks, the *Rhinoceros* and *Ulrich Varnbüler*, to which he added one and two tone blocks, respectively.²⁹ Both prints bear the address *Ghedrukt t'Amsterdam by Willem Janssen in de vergulde Sonnewyser*.³⁰ The same address appears on later impressions of Goltzius's *Mars in Half-length* and *Hercules Killing Cacus*. Janssen used this address 1604–c.1620, when he added Blaeu to his name.³¹ The watermark in the paper of a number of both the Dürer and Goltzius impressions seems to date them to around 1620.³² It stands to reason that Janssen bought all of Goltzius' woodblocks, possibly shortly after Goltzius' death in 1617. Since Goltzius's prints were highly desirable, reissuing impressions, even with a badly split block (like *Gillis van Breen*) was presumably still profitable. As with Dürer's woodcuts, Janssen added two tone blocks to Goltzius' *Gillis van Breen* key block, which were printed in green and ochre.³³ In the same way he added tone blocks to other woodcuts that Goltzius himself never intended to be chiaroscuro woodcuts, such as the *Mary Magdalen* (c.1585–88) and *Four Small Landscapes* (c.1597–1600). Early impressions of these prints are known only on blue and, very rarely, white paper; late impressions have two tone blocks.

The assumption that Goltzius had no part in these later impressions of his woodcuts and chiaroscuro woodcuts can be illustrated by a unique example. In *Tethys*, one of the *Deities*, the light tone block of the single known early impression in a grey palette (Fig. 14.3) disappeared in later

me, but the question remains whether this would be possible with a sixteenth-century roller press.

27 NH-DF Goltzius 2: 192–208, nos. 294–300. To the impressions in muted colours can be added impressions of all prints except *Demogorgon* and *Tethys* in the Art Institute of Chicago, 1927.981–985; *Demogorgon*, sold by Sotheby's, London, 19 September 2012, lot 12; *Pluto*, Amsterdam, Rijksmuseum, RP-P-2013-44-1; *Pluto*, Bruges, Groeningemuseum, 0000.GRO4066.II.

28 Bialler, *Chiaroscuro Woodcuts*, 82–83, 95–96.

29 On Janssen's role in their reprinting, see A. Grebe, 'Dürer in Chiaroscuro', this volume, 178–79.

30 Bialler, *Chiaroscuro Woodcuts*, 84–86, nos. I, J.

31 D. van Netten, *Koopman in kennis: de uitgever Willem Jansz. Blaeu in de geleerde wereld (1571–1638)* (Zutphen: Walburg Pers, 2014), 29–30.

32 Bialler, *Chiaroscuro Woodcuts*, 105, n.12. Janssen owned intaglio presses since the 1590s but typographic presses only from 1617; see Van Netten, *Koopman in kennis*, 33.

33 A comparison of the Dürer and Goltzius impressions showed that their palettes are not exactly the same.



FIGURE 14.3 *Hendrick Goltzius, Tethys, c.1588–90, chiaroscuro woodcut from three blocks in black/grey/dark grey, 34.8 × 26.0 cm*
COBURG, KUNSTSAMMLUNGEN DER VESTE COBURG, VII.31.178



FIGURE 14.4 *Hendrick Goltzius, Tethys, c.1620, chiaroscuro woodcut from three blocks in black/ochre/brown, 34.8 × 26.0 cm*
AMSTERDAM, RIJSMUSEUM, RIJKSPRENTENKABINET, RP-P-OB-10.477; © THE RIJSMUSEUM

impressions, which were printed with the key block and dark tone block only. As Bialler argued, it could have been damaged or lost, or it may have been rejected because the blocks are not fully coordinated.³⁴ However, in even later impressions, the light tone block has been replaced by a new one (Fig. 14.4). These later impressions in tan/green and ochre/brown palettes all show advanced deterioration to the blocks, most noticeable in a wormhole in the chariot at upper right and a wide gap in the upper border-line. Stylistically, the new light tone block differs from the way Goltzius cut the light tone blocks for the other *Deities*. As in the *Proserpina*, he created highlights on the bodies by making energetic, nervous scratches (Fig. 14.5). In comparison, in the new light tone block the neat, parallel strokes are dull and uninspired, and the even strokes and

white patches are consistent with those in the tone blocks Janssen added to *Gillis van Breen*.³⁵

In conclusion it can be stated that Goltzius produced only the early impressions of the *Deities*, all in grey and muted palettes that imitate pen and wash drawing with white highlights, and that all later impressions were most likely published by Janssen, in palettes that do not honour Goltzius's original intentions.

Combining Techniques

After his return from his trip to Italy in 1590–91, Goltzius abandoned Spranger's mannered style for a more

34 Ibid., 125–26. For illustrations of the impression without the light tone block, see *ibid.*, 128, fig. 28 II and NH-DF Goltzius 2, 205, fig. 296/II.

35 The new light tone block was also attributed to Janssen by T. Rassieur, 'Chiaroscuro Woodcuts: Hendrick Goltzius and his Time', *Print Collector's Newsletter* 24 (1993), 10–12. Refuted by C. Ackley, 'Goltzius' Chiaroscuro Woodcuts', *Print Quarterly* 12 (1995), 82.



FIGURE 14.5 *Hendrick Goltzius, Proserpina, c.1588–90, chiaroscuro woodcut from three blocks in black/tan/dark grey, detail, 34.9 × 25.8 cm*
AMSTERDAM, RIJKSMUSEUM, RIJKSPRENTENKABINET,
RP-P-OB-10.478; © THE RIJKSMUSEUM

classically inspired one. His most famous prints, the 'masterpieces' of the *Birth and Early Life of Christ* (1593–94), were stylistically and technically based on prints after Italian designs by northern engravers, such as Cornelis Cort after Federico Barocci and the brothers Johannes Aegidius and Raphael Sadeler after Jacopo Bassano, as well as on Dürer and Van Leyden.³⁶ This more classically inspired style, influenced by northern printmaking, can be seen in his exploration around 1593 of yet another aspect of printing with colour: combining a woodcut tone block with a copper engraved design. The technique was well known to him from the illustrations in his cousin

Hubert Goltzius's famous book of medals of emperors, which went through several editions after its first publication in 1557.³⁷ However, Hendrick was more inspired by the prints in the same technique by or after Crispijn van den Broeck and the school of Frans Floris, which had been printed in Antwerp (c.1570).³⁸

Only two designs are known in which Goltzius experimented with this technique, both in unique impressions. *Diligence* was discussed and illustrated by Bialler; *Wisdom* was recently located in the Kupferstichkabinett, Berlin (Fig. 14.6).³⁹ They represent two of a series of three virtues (no colour impressions of *Patience* are known), most likely engraved by Jan Saenredam after designs by Goltzius c.1593. The tone blocks are used to complete the background architecture, give more depth to the figure by highlights and shadow and fill the foreground with leaves and grass. The tone block of *Diligence* was printed in a pale olive-green, but *Wisdom* is in a darker green that makes details of the tone block, such as the cross-hatching on the figure and the foliage in the foreground, more complementary to the composition. In the latter, Goltzius's monogram is cut out from the tone block, similar to the manner in which Van den Broeck's monogram appears on his prints. The tone blocks were clearly conceived together with the engravings, since the composition (especially the background architecture) is incomplete without the tone blocks. In them, Goltzius abandoned the bold technique of the *Deities* for a less agitated one, closer in style to that of his examples and more congruous with the statuesque figures and classical architecture of his designs.

Goltzius may not have been satisfied with his experiment in the relief and intaglio technique or found it too complicated to pursue, as it required two different presses. Together with a number of other plates that Goltzius had left unfinished, the Virtues ended up in the stock of the Amsterdam publisher Robert de Baudous, who published them in 1615 with his address and the date added.⁴⁰ He also added Goltzius's monogram and the numbering, titles and verses. The compositions were probably finished around the same time in his workshop (Fig. 14.7). It is unlikely that De Baudous also acquired the

36 NH-DF Goltzius 1: 15–32, nos. 8–13; H. Leeftang, 'A Proteus or Vertumnus in Art: The Virtuoso Engravings 1592–1600', in Leeftang and Luijten, eds, *Hendrick Goltzius*, 207–08, 210–15, no. 75.

37 H. Goltzius, *Vivae Omnium fere Imperatorum Imagines* (Antwerp: Copenius, 1557); Bialler, *Chiaroscuro Woodcuts*, 30–34, no. 2; see also E. Wouk, "Divine, August and Immortal", this volume, 151.

38 Bialler, *Chiaroscuro Woodcuts*, 54–63, nos. 9–13, 68–77, nos. 17–21, 210; NH-DF Crispijn van den Broeck 1: xxxiv, 67–74, nos. 79–84; NH-DF Floris 1: lviii, 6–13, nos. 2–6.

39 Bialler, *Chiaroscuro Woodcuts*, 209–11, no. 59; NH-DF Goltzius 3: 195–201, nos. 516–18.

40 See NH-DF Goltzius 1: lxi–lxii.



FIGURE 14.6 *Hendrick Goltzius, Wisdom, c.1593, engraving and chiaroscuro woodcut tone block in green, 36.2 × 24.0 cm*
BERLIN, STAATLICHE MUSEEN ZU BERLIN, KUPFERSTICHKABINETT, 37-1883

tone blocks.⁴¹ In fact, he may not have known about them because the background architecture in the second state differs from that in the tone block, especially in the roof-tops and the backdrop view, and he did not copy the foreground foliage.

The combination of engraving and chiaroscuro was Goltzius's last experiment in printing in colour. However, in his drawings he became increasingly interested in the



FIGURE 14.7 *Hendrick Goltzius, Wisdom, 1615, engraving, 36.2 × 24.0 cm*
AMSTERDAM, RIJKSMUSEUM, RIJKSPRENTENKABINET, RP-P-OB-10.679; © THE RIJKSMUSEUM

use of colour after his return from Italy. Van Mander related how impressed Goltzius was by Italian painting techniques and how he used more colour in his drawings.⁴² In 1600 he gave up printmaking altogether to turn to painting, a choice that Larry Nichols rightly described as 'a deliberate decision to embrace an even greater challenge and to seek greater recognition for his artistry'.⁴³

⁴¹ It is unlikely that it was De Baudous who added the tone blocks, as Bialler tentatively suggested, because he never published any prints in this combined technique, and there is no reason to think that it was not Goltzius himself who tried this technique; Bialler, *Chiaroscuro Woodcuts*, 210.

⁴² Van Mander, *Schilder-Boeck*, fol. 285^v, lines 15–26.

⁴³ L.W. Nichols, *The Paintings of Hendrick Goltzius (1558–1617): A Monograph and Catalogue Raisonné* (Doornspijk: Davaco, 2013), 77.

Dürer in Chiaroscuro: Early Modern Graphic Aesthetics and the Posthumous Production of Colour Prints

Anja Grebe*

The Beginnings of the 'Fine Art' Colour Woodcut in Germany

On 24 September 1508, the imperial counsellor and humanist Konrad Peutinger drafted a letter to His Excellency, Friedrich III, Elector of Saxony.¹ He thanked Friedrich III for having sent him a print of a '*kurisser*' (French: *cuirassier*; an equestrian in a suit of armour) the previous year that the Elector's court artist had printed in gold and silver. He also informed him about his recent success in printing with gold and silver and asked for his opinion on an enclosed sample. He sent Georg, Duke of Saxony, a similar letter the next day, enclosing another impression and specifying that he and 'his artists' had worked hard for several months to discover the secret of 'printing in gold and silver on parchment and paper'.² Friedrich III's court artist was Lucas Cranach, and one of the prints he sent is assumed to be *St George on Horseback*, of which one copy in black and gold on paper survives.³ Peutinger worked closely with Hans Burgkmair, and the

'*getruckt kurisser*' (printed cuirassiers) are presumed to be Burgkmair's *St George on Horseback*, of which one impression in gold, silver and black on parchment survives,⁴ and its pendant, *Maximilian I on Horseback*, of which two impressions in gold and black, one on parchment and one on paper, are known.⁵ The latter responded to Cranach's print with a Venetian touch, as the design is modelled on Andrea del Verrocchio's bronze statue *Bartolomeo Colleoni* (c.1479–88) in Campo Ss. Giovanni e Paolo, Venice, and possibly the architecture of Saint Mark's Basilica, Venice.⁶ Whether it was the patrons or artists who were trying to outdo each other, both Burgkmair and Cranach depicted the same imperial subjects with the same precious metals to create the same effect (Fig. 15.1).⁷

Cranach's and Burgkmair's 'riders' are considered to be the first single-sheet colour woodcuts (they are sometimes called the first 'real' colour prints) in the West and the first artworks printed with precious metal in Germany.⁸

On earlier examples, see V. Carter, L. Hellinga and T. Parker, 'Printing in Gold in the Fifteenth Century', *British Library Journal* 9 (1983), 1–13.

- 4 Berlin, Kupferstichkabinett, 3–1924; TIB 11: 29, no. 23; H-G 7: 74, no. 253.1a.
- 5 For different states and editions, see H-G 7: 108–09, no. 323; T. Falk, *Hans Burgkmair: Das graphische Werk*, exh. cat. (Augsburg: Städtische Kunstsammlungen, 1973), nos. 21–22; Dackerman, *Painted Prints*, 117–19, no. 12. On the impression on paper (Oxford, Ashmolean Museum, Douce bequest); see Falk, *Das graphische Werk*, no. 21a; C. Dodgson, 'Rare Woodcuts in the Ashmolean Museum, Oxford, 11. Other Woodcuts by Burgkmair', *The Burlington Magazine for Connoisseurs* 39 (1921), 68–71, 74–75, esp. 68–70. On the impression on parchment (Art Institute of Chicago, 1961.3), see H. Joachim, 'Maximilian I by Burgkmair', *The Art Institute of Chicago Quarterly* 55 (1961): 5–9.
- 6 L. Silver, *Marketing Maximilian: The Visual Ideology of a Holy Roman Emperor* (Princeton, NJ: Princeton University Press, 2008), 112.
- 7 See E. Chmelarz, 'Jost de Negker's Helldunkelblätter Kaiser Max und St. Georg', *Jahrbuch der kunsthistorischen Sammlungen des Allerhöchsten Kaiserhauses* 15 (1894), 392–97; A. Reichel, *Die Clair-Obscur-Schnitte des XVI., XVII. und XVIII. Jahrhunderts* (Zurich: Amalthea, 1926), 12–18; Dodgson, *Rare Woodcuts*, 68–70.
- 8 See Falk, *Burgkmair*, 70–71. M.J. Friedländer, 'Burgkmairs Hl. Georg von 1508: Bemerkungen zu den Anfängen des deutschen Tonschnittes', *Jahrbuch der Preussischen Kunstsammlungen* 46 (1925), 1–2; Messling, *Cranach*, 133–34, no. 50; D. Landau and P. Parshall,

* I would like to thank Ad Stijnman and especially Elizabeth Savage for their valuable suggestions and comments, as well as information about printing processes and surviving materials.

1 For excerpts from the original texts, see T. Falk, *Hans Burgkmair: Studien zu Leben und Werk des Augsburger Malers* (Munich: Bruckmann, 1968), 115, no. 36.

2 Ibid., 115, no. 36b.

3 London, British Museum, 1895.0122.264. TIB 11: 383, no. 65; H-G 6: 58, no. 81.1a. G. Bartrum, ed., *German Renaissance Prints, 1490–1550*, exh. cat. (London: British Museum, 1995), 171–72, no. 173; G. Messling, ed., *Die Welt des Lucas Cranach: Ein Künstler im Zeitalter von Dürer, Tizian und Metsys*, exh. cat. (Brussels: Bozar Books, 2010), 132–33, no. 49; S. Dackerman, *Painted Prints: The Revelation of Color in Northern Renaissance and Baroque Engravings, Etchings and Woodcuts*, exh. cat. (Baltimore: The Baltimore Museum of Art; University Park, PA: Pennsylvania State University Press, 2002), 114–16, no. 11, states that the gold was not directly printed from the block, but applied through flock printing. Elizabeth Savage contested this in E. Giselsbrecht and E. Savage (formerly Upper), 'Glittering Woodcuts and Moveable Music: Decoding the Elaborate Printing Techniques, Purpose, and Patronage of the *Liber Selectarum Cantionum*', in *Senfl Studien I*, ed. S. Gasch, B. Lodes and S. Tröster, Wiener Forum für ältere Musikgeschichte 4 (Tutzing: Hans Schneider, 2012), 17–67, esp. 37–38.



FIGURE. 15.1 *Lucas Cranach, St George, 1507, colour woodcut from two blocks, 23.3 × 15.9 cm*
LONDON, BRITISH MUSEUM, 1895,0122.264 © TRUSTEES OF THE BRITISH MUSEUM

Scholars have struggled to categorise them as ‘chiaroscuro’ because their approach is very different from that used for the so-called ‘false chiaroscuro’ or ‘German chiaroscuro’ versions,⁹ that were reissued with tone blocks from 1508. (In this scheme, their lack of tonal contrast distinguishes those with interdependent tone blocks in the ‘true chiaroscuro’ style imitating Italian wash drawings that Ugo da

Carpi invented in 1516; see Takahatake Fig. 10.1, p. 117).¹⁰ Surviving impressions in gold or gold/silver are on either parchment or a vibrantly prepared paper, with the additional block adding highlights to the black lines of the key block. All colour impressions printed after the second state have a tone block rather than a highlight block, and the design is mutually built up from the tone block and the key block (although the key block’s design is independent).¹¹ The tone block models the figures and backgrounds, and the highlights are produced by the paper support, which shines through the areas not covered by ink. The Antwerp-born blockcutter and printer Jost de Negker is often credited with the innovation of cutting highlights from tone blocks, but his name appeared only on later states and he is not recorded in Augsburg before 1512.¹²

The history of the invention of the ‘fine art’ colour woodcut in Germany, as opposed to that for book illustrations or the decorative arts, is interesting in several respects. Firstly, the initiative, at least in Augsburg, most probably did not come from an artist, but from Peutingner, who acted as a kind of impresario or producer. He and Burkgmair had both worked with the local printer Erhard Ratdolt, who had issued colour-printed woodcut book illustrations from the early 1480s and at least two ‘presentation copies’ of Peutingner’s *Romanae vetustatis fragmenta* with partially gold-printed text on parchment in 1505 or slightly later.¹³ In Wittenberg, Cranach was strongly supported by the Saxon princes, who promoted his innovation. It is telling that the correspondence does not specify the artists by name; the humanist patrons communicated

The Renaissance Print, 1470–1550 (New Haven, London: Yale University Press, 1994), 184–90. On the ‘invention’ in 1508, see A. Klein, ‘Hans Wechtlin’, this volume, 103; E. Savage, ‘Colour Printing in Relief’, this volume, 27–28; E. Savage, ‘A Printer’s Art’, this volume, 97. On earlier colour prints (e.g., book illustrations) from the 1470s, see E. Savage, *Vivid Prints: Colour Printmaking and the Transformation of Visual Information in Early Modern Germany, 1476–ca. 1600*, esp. Chapter 2: ‘Ratdolt and His Many Peers: Medieval Colour Printmaking, 1476–c.1510’ (forthcoming). On earlier text printed in gold, see below.

⁹ See E. Savage, ‘Colour Printing in Relief’, this volume, 23–24; Savage, *Vivid Prints*.

¹⁰ See N. Takahatake, ‘Ugo da Carpi’s *Diogenes*’, this volume, 116.

¹¹ E.g., Hans Burgkmair, *St George*, 1508, Cambridge, Fitzwilliam Museum, P.3385-R.

¹² On the different printing techniques see T. Primeau, ‘The Materials and Technology of Renaissance and Baroque Hand-Colored Prints’, in Dackerman, *Painted Prints*, 49–78, esp. 68–72. On De Negker’s dates of arrival in Augsburg and involvement with the ‘invention’, see Silver, *Marketing Maximilian*, 121; A. Klein, ‘Hans Wechtlin’, this volume, 103–15; E. Savage (formerly Upper), ‘Printing Colour in the Age of Dürer: “Chiaroscuro” Woodcuts from the German-Speaking Lands’ (PhD diss., University of Cambridge, 2012), esp. Chapter 3: Reinventing the Invention, 1: 60–80.

¹³ Chicago, Newberry Library, Wing ZP 547.R11 and Vienna, Österreichische Nationalbibliothek, C.P.1.C.4; C. Wood, ‘Early Archeology and the Book Trade: The Case of Peutingner’s *Romanae Vetustatis Fragmentae* (1505)’, *Journal of Medieval and Early Modern Studies* 28.1 (1998): 83–118, esp. 105–06; on Augsburg, see G. Jecmen, ‘Color Printing and Tonal Etching: Innovative Techniques in the Imperial City, 1487–1536’, in G. Jecmen and F. Spira, *Imperial Augsburg: Renaissance Prints and Drawings, 1475–1540*, exh. cat. (Farnham: Lund Humphries, 2012), 67–101.

breakthroughs by 'their artists' to other humanists in a game of one-up-manship.¹⁴

Secondly, the new technique demanded highly skilled blockcutters and printers – for instance, De Negker. They also might be designated as its true inventors, or at least its enablers,¹⁵ in line with the new understanding of the early dissemination of colour printmaking as linked to printers, not 'artists'.¹⁶

And thirdly, the whole affair proves to be a competition among princely sponsors who had an interest in producing unusual prints, probably to use as exclusive presents. This elaborate technique was not intended as a mass phenomenon but was instead geared to a small clientele of art lovers who, as members of Maximilian I's imperial court, had a special appreciation for sophisticated printmaking.¹⁷ They probably also collected drawings by the same artists. An early example, which might have been addressed to this kind of clientele, is Cranach's *St Martin* (1504), executed with pen and ink with grey-brown wash and heightened in white on paper prepared with blue wash, though there is no proof that it has ever been in princely possession.¹⁸

Dürer and Colour Printing

All three aspects are important when we try to understand why Albrecht Dürer, the most prolific and inventive graphic artist of the sixteenth century, almost certainly never produced any colour woodcuts himself, even though the Nuremberg artist was open to technical experiments. In the case of iron etching, he did not mind imitating Daniel Hopfer, who had pioneered the use of etching for printmaking in Augsburg c.1500.¹⁹ Most probably, the

Dürer workshop never produced any hand-coloured copies of his own prints and books, unlike that of Dürer's master Michael Wolgemut.²⁰ The colouring on some Dürer prints was most certainly added by a professional *Briefmaler* (print painter; lit. letter-painter) or illuminator upon the request of individual owners who wished to enhance the woodcuts or engravings in their possession.²¹ We do not know if Dürer altogether refused the idea of colour on his prints or whether he simply was not interested. I would guess the latter, though he obviously did not object to owners' having colour added to prints.²²

Regardless of his attitude towards the hand-painting of his prints, there may be several distinct reasons why he did not produce any colour-printed woodcuts. As stated above, the skill of the blockcutter and printer was more crucial to the success of this kind of print than to a 'normal' woodcut, and the poor quality of colour-printed book illustrations indicates that there was no printer in Nuremberg during Dürer's lifetime who would have been able to produce sophisticated colour woodcuts.²³ Secondly, colour printing may not have been very profitable due to the complicated procedure and need for pigments, at least in its first, experimental phase, but no information about the additional cost of production or the (presumably) additional profit at the point of sale is known.²⁴ And

14 Landau and Parshall, *Renaissance Print*, 185–90.

15 This is postulated by Landau and Parshall, *Renaissance Print*, 200.

16 On Strasbourg in the 1510s, see A. Klein, 'Hans Wechtlin', this volume, 103–15; on Germany and other European countries in the sixteenth century, see E. Savage, 'A Printer's Art', this volume, 33–41, respectively.

17 See Landau and Parshall, *Renaissance Print*, 184–90.

18 Munich, Staatliche Graphische Sammlung, 36. C. Grimm et al., eds, *Lucas Cranach. Ein Maler-Unternehmer aus Franken*, exh. cat. (Augsburg: Haus der Bayerischen Geschichte, 1994), 303, no. 124 (U. Timann); Messling, *Cranach*, 106–07, no. 13.

19 C. Metzger, *Daniel Hopfer: Ein Augsburger Meister der Renaissance*, exh. cat. (Berlin: Deutscher Kunstverlag, 2009), 18–20; G. Jecman, 'Colour Printing and Tonal Etching: Innovative Techniques in the Imperial City, 1487–1536', in *Imperial Augsburg: Renaissance Prints and Drawings, 1475–1540*, ed. G. Jecman and F. Spira, exh. cat. (Washington, DC: National Gallery of Art, 2012), 67–101, esp. 80–98.

20 On books and prints hand-coloured by Wolgemut or the Koberger workshop, see R. Herz, 'Buchmalerei in der Offizin Anton Kobergers (ca. 1472–1504)', in G.U. Großmann, ed., *Dürer-Forschungen*, 2: Buchmalerei der Dürerzeit, Dürer und die Mathematik, Neues aus der Dürerforschung (Nuremberg: Verlag des Germanischen Nationalmuseums, 2009), 39–64.

21 Among the examples are differently coloured impressions of the title page of the *Reformacion der Stat Nüremberg* (1522); D. Paisey, 'Two New Dürers in London?', *Gutenberg-Jahrbuch* 78 (2003), 31–44.

22 See Ibid.; T. Eser and A. Grebe, *Heilige und Hasen: Bücherschätze der Dürerzeit*, exh. cat. (Nuremberg: Verlag des Germanischen Nationalmuseums, 2008), esp. 72–73, cat. 15 for various coloured examples of Dürer's *Crucifixion* (1516), and 74–75, cat. 16 for copies of the *Reformacion der Stat Nüremberg* (1522).

23 Of the 238 colour-printed book illustrations and broadsides that Elizabeth Savage identified in her preliminary survey of those issued in the early modern German-speaking lands, the only four from Nuremberg were broadsides printed long after Dürer's death; Savage (formerly Upper), 'Printing Colour' 2: 282, 285, 291, 292. I would like to thank her for sharing her research with me.

24 The earliest record of the additional costs of colour printing may be the regulations for the wages of printers in Frankfurt in 1573; *Rotdruck* (red printing) or *Titulgeld* (title-money), presumably for printing the title pages of books in red and black, earned printers a *Titelbier* (title-beer), which may translate colloqually as a 'beer bonus'. R. Reith, *Lohn und Leistung: Lohnformen im*

thirdly, Dürer apparently never made 'autonomous' – in the sense of 'finished' works of arts in their own right, as opposed to studies or working copies – chiaroscuro drawings like his contemporaries Albrecht Altdorfer, Hans Baldung (Grien) and Lucas Cranach.²⁵ There may simply not have been a market for this style of graphic art in Nuremberg. Without an interested patron to urge him on, a specially skilled printer to work with or a plausible way to 'mass produce' colour woodcuts for an audience or the guarantee of a strong return on his investment of time and materials, Dürer had no reason to design colour woodcuts.

As to his artistic interests, besides the motives related to the hand-colouring of his prints, Dürer fought for painters to have higher social standing in Germany as well as for his own greater fame as an artist. He bemoaned his 'lowly' status in Germany, as opposed to his being respected as a '*zentilam*' in Venice early in his career ('Here I'm a lord; at home I'm a parasite'),²⁶ and the Low Countries later on (where he was welcomed as a great lord, '*einen grosen herren*').²⁷ However, his reputation was mainly founded on his widely disseminated black-and-white

printed work, which was also the major source of his quite respectable fortune.²⁸ This was famously summarised by Desiderius Erasmus shortly after Dürer's death in 1528, in a eulogy that celebrated his capability to express everything only with lines:

...what does he not express in monochromes, that is by black lines? Shade, light, radiance, projections, depressions. ...He even depicts what cannot be depicted: fire; rays of light; thunderstorms; sheet lightning; thunderbolts; or even, as the phrase goes, the clouds upon a wall; characters and emotions – *in fine*, the whole mind of man as it shines forth from the appearance of the body, and almost the very voice. These things he places before our eyes by the most felicitous lines, black ones at that, in such a manner that, were you to spread on pigments, you would injure the work. And is it not more wonderful to accomplish without the blandishment of colours what Apelles accomplished only with their aid?²⁹

His application of Pliny's characterisation of the skill of the legendary ancient painter Apelles to Dürer's skill in printmaking is commonly accepted as enthroning Dürer as the 'Apelles of black lines', but this may overlook a significant nuance.³⁰ The epithet of Dürer as the 'new Apelles' did not originate in this text,³¹ but Erasmus can

Gewerbe, 1450–1900 (Stuttgart: Steiner, 1999), 211; Savage (formerly Upper), 'Printing Colour', 1: 102.

25 On the question of 'autonomy' in art see W. Busch, 'Die Autonomie in der Kunst', *Funkkolleg Kunst. Eine Geschichte der Kunst im Wandel ihrer Funktionen*, vol. 1, ed. W. Busch (Munich: Piper, 1987), 230–56; P. Pakesch, ed., *Symposium 'Die Autonomie in der Kunst'* (Basel: Schwabe, 2001). The early modern concepts of 'autonomous drawings' are discussed in U. Westfeling, *Zeichnen in der Renaissance: Entwicklung, Techniken, Formen, Themen* (Cologne: DuMont, 1993), esp. 83–85. On Dürer see S. Porras, "'ein freie hant": Autonomy, Drawing and the Young Dürer', *The Early Dürer*, exh. cat. (Nuremberg: Germanisches Nationalmuseum, 2012), 245–59. However, there are no chiaroscuro drawings by Dürer which could unambiguously be designated as 'autonomous' according to the definition given above. Dürer's drawings with black and white ink on blue paper or on prepared paper were all meant to serve as preparatory studies for his paintings. Other more 'finished' chiaroscuro drawings like the much debated 'Green Passion' are very probably copies and forgeries by a later artists; A. Robison and K.A. Schröder, *Albrecht Dürer. Master Drawings, Watercolors, and Prints from the Albertina*, exh. cat. (Washington: National Gallery of Art, 2013), 148–67, 156–91, 258–69.

26 The term *zentilam* (also *Czentillam*) is taken from Dürer's letter to Pirckheimer from Venice dated 18 August 1506. The sentence reads: *Ich pyynn ein zentilam zw Fenedig worden*; H. Rupprich, ed., *Dürer: Schriftlicher Nachlass*, 3 vols. (Berlin: Deutscher Verein für Kunstwissenschaft, 1956–69), 1: 52. '*Hy' pin jch ein her, doheim ein schmarotzer*'. Albrecht Dürer to Willibald Pirckheimer, 13 October 1506, *Ibid.*, 1: 59.

27 A. Dürer, *Diary of the Journey to the Netherlands, 1520–1521*, *Ibid.*, 1: 151.

28 In a letter Dürer wrote to his Frankfurt patron Jacob Heller on 26 August 1509, he complained about painting being detailed, painstaking work that took a great deal of time and announced that he would like to go back to printmaking, which would be likely to make him much more money; *Ibid.*, 3: 72. On Dürer's fortune, see the contract drawn between his widow and his brothers in *Ibid.*, 3: 238.

29 D. Erasmus, *De recta Latini Graecique sermonis pronuntiatione dialogus* (Basel: Officina Frobeniana, 1528), 46, English translation quoted from J. Bialostocki, *Dürer and his Critics 1500–1971: Chapters in the History of Ideas Including a Collection of Texts* (Baden-Baden: Koerner, 1986), 31.

30 However, there may be another (additional) meaning: Erwin Panofsky argued that this passage is an example of what Erasmus called *speciosa reprehensio* (ironic or teasing praise, lit. splendid blame) that simultaneously acknowledged that Dürer was the greatest artist of his generation but that, at the same time, he may not have known when to stop. He noted Pliny had named Protogenes, who was famous for not knowing when a painting was finished, rather than Apelles, and that this 'error' would have been obvious to Erasmus's humanist readers; E. Panofsky, 'Erasmus and the Visual Arts', *Journal of the Warburg and Courtauld Institutes* 32 (1969): 200–27, esp. 220–23.

31 For the history and influence of the comparison of Dürer to Apelles, see F. Checa, "'What cannot be painted": Ideas, Approaches and Themes in German Painting at the Time of

be credited with the implementation of the idea of Dürer as the 'black-and-white Apelles' above all because his text was reprinted as an introductory text in the Latin editions of Dürer's Four Books on Measurement (*Institutiones Geometricae*).³² It became widespread among the humanist audience and was frequently repeated by early modern historiographers.

Dürer in Colour

Notwithstanding this view, colour was commonly added to woodcuts and engravings during Dürer's lifetime in order to make them look like watercolours or illuminated miniatures, and his prints were no exception. Colour was long thought to contradict the original artistic concept of early modern graphic art because of the heritage of neoclassical visual values on the study of graphic art and, more recently, the influence of Panofsky's privileging of that visual purity in his study of Dürer.³³ At least in the eyes of Dürer's contemporaries, it helped to transform a serial object into a unique artwork and to increase the decorative as well as the material value of the print.³⁴ In some cases, collectors even painted their prints themselves, participating in the process of production and (presumably) investing objects they owned with a special sentimental or spiritual value.³⁵ In early modern inventories from the German-speaking lands, coloured or illuminated prints are sometimes recorded

as framed and listed among paintings. Their estimated price often equalled or even exceeded the price of much larger paintings on canvas.³⁶ But compared with the fairly large number of hand-coloured prints, few colour impressions have survived of the only three of or after Dürer's woodcuts issued in colour: a deceptive copy of *Maximilian I* (c.1519; first printed in colour around that time), *Rhinoceros* (1515; first printed in colour in the 1620s) and *Ulrich Varnbüler* (1523; first printed in colour in the 1620s).³⁷ The latter two also have an independent key block, but they can be described as chiaroscuro woodcuts. The *Rhinoceros* (1515) was printed with one tone block from which highlights had been removed, and *Ulrich Varnbüler* (1523) with two tone blocks that were printed in related muted tones to build a three-dimensional effect. Its effect imitates that of chiaroscuro (wash) drawings, which had long been prized by Northern European collectors and which were in vogue again during the 'Dürer Renaissance' of the 1620s and 1630s, a century after Dürer's death in 1528.

Dürer in Gold

In the two surviving impressions of an early copy of Dürer's *Maximilian I* (after 1519), in the Staatsbibliothek Bamberg and the Schlossmuseum, Gotha, the design was produced in black and gold and then hand-coloured.³⁸ The impressions are abraded, dirtied and discoloured except along their lower edges, indicating that both had

Dürer', *Durero y Cranach: Arte y Humanismo en la Alemania del Renacimiento*, ed. F. Checa, exh. cat. (Madrid: Fundación Colección Thyssen-Bornemisza, 2007), esp. 462–64, 468–69. A. Grebe, *Dürer: Die Geschichte seines Ruhms* (Petersberg: Imhof Verlag, 2013), 117–28.

32 Albrecht Dürer, *Institutiones geometricae*, trans. J. Camerarius (Paris: Christian Wechel, 1535), fol. A IIb. On the different editions of Dürer's *Treatise on Geometry* see H. Bohatta, *Versuch einer Bibliographie der kunsttheoretischen Werke Albrecht Dürers* (Vienna: Gilhofer & Ranschburg, 1928), 9–13.

33 Susan Dackerman discusses both points in Dackerman, *Painted Prints*, 11–15.

34 See Eser and Grebe, *Heilige und Hasen*; Paisey, *Dürers*; Dackerman, *Painted Prints*.

35 For examples, see D.S. Areford, 'The Image in the Viewer's Hands: The Reception of Early Prints in Europe', *Studies in Iconography* 24 (2003): 5–42; D.S. Areford, *The Viewer and the Printed Image in Late Medieval Europe* (Farnham: Ashgate, 2010), esp. 65–103; B. Hernad, *Die Graphiksammlung des Humanisten Hartmann Schedel* (Munich: Prestel, 1990); P. Parshall and R. Schoch, eds, *Origins of European Printmaking: Fifteenth-century Woodcuts and Their Public*, exh. cat. (Washington: National Gallery of Art; New Haven: Yale University Press, 2005).

36 This applies, for example, to the Dürer collection of the Nuremberg patrician Willibald Imhoff. For an overview of the collection, see the diagram at the end of A. von Eye, *Leben und Wirken Albrecht Dürer's* (Nördlingen: Beck, 1869), unpaginated. For a supposedly coloured version of *St Eustache*, see W. Sauerländer, ed., *Die Münchner Kunstkammer*, 3 vols. (Munich: Bayerischen Akademie der Wissenschaften, 2008) 2: 779, no. 2669.

37 W.L. Strauss, *Clair-obscur: Der Farbholzschnitt in Deutschland und den Niederlanden im 16. und 17. Jahrhundert: Vollständige Bilddokumentation und Gesamtkatalog* (Nuremberg: Carl, 1973), 2–7, nos. 1–3.

38 Staatsbibliothek Bamberg, I G 55, printed with goldleaf and black on paper prepared with dark brown wash. P. Strieder et al., *Albrecht Dürer 1471–1971*, exh. cat. (Munich: Prestel, 1971), 141, no. 259; J. Sander, ed., *Dürer: Kunst – Künstler – Kontext*, exh. cat. (Munich et al.: Prestel, 2013), 326–28, no. 13.10. Stiftung Schloss Friedenstein Gotha, Kupferstichkabinett, 8, 26, printed in gold and black with hand colouring, 41.5 x 32.3 cm; for further information and bibliography, see <http://www.museum-digital.de/thue/pdf/publicinfo.php?oges=98> (accessed 6 March 2013). J. Meder, *Dürer-Katalog: Ein Handbuch über Albrecht Dürers Stiche, Radierungen, Holzschnitte, deren Zustände, Ausgaben und Wasserzeichen* (Wien: Gilhofer & Ranschburg, 1932), 236.



FIGURE 15.2 *After Albrecht Dürer, Maximilian I, after 1519, colour woodcut from two blocks, 42.6 × 32.1 cm*
STAATSBIBLIOTHEK BAMBERG, I G 55; © STAATSBIBLIOTHEK BAMBERG, PHOTO: GERALD RAAB

been framed and displayed.³⁹ For the gold elements, two techniques seem to have been used.

For the Bamberg impression (Fig. 15.2), the tone block was inked with an oil varnish and printed. The sticky 'mordant' was then covered with gold leaf, and the overlap of sheets of gold leaf is apparent especially in the lower lefthand corner. The sheet was then run through the press again to take an impression of the key block in black.⁴⁰

In contrast, the Gotha impression appears to have been printed with gold ink from a tone block like the one that



FIGURE 15.3 *Tone block for Fig. 15.2, woodblock with apparent residue of gold ink, 20.4 × 32.2 × 2.1 cm*
VIENNA, ALBERTINA, HO2006/668; © 2014 / ALBERTINA, WIEN

(partly) survives in the Albertina (Fig. 15.3).⁴¹ This block has the same imperial provenance as the woodblocks for the *Triumphal Arch* and *Triumphal Procession* of Maximilian I.⁴²

Max Geisberg suggested that the watermark of the Gotha impression points to an origin in Augsburg in the 1520s, probably during Dürer's lifetime,⁴³ and he postulated that it was executed there by the imperial block cutter and printer Jost de Negker. De Negker's printer's address is also found on colour impressions of Burgkmair's *St George* and *Maximilian I* printed around 1518, and a woodcut of *Charles V*, dated 1519, that Elizabeth Savage recently identified as possibly having the same kind of 'printed gold'.⁴⁴ This method was used for the only three known early modern

39 The parts that now appear grey were likely coloured, as indicated by blue elements along the lower edge. In contrast, the hand-coloured and partly illuminated impressions of the *Maximilian I* in Coburg and Berlin are much brighter; Dackerman, *Painted Prints*, 129–32.

40 Heller does not mention the impression in his catalogue raisonné of Dürer's works edited in 1827–31, which points to a later date of acquisition; J. Heller, *Das Leben und die Werke Albrecht Dürers*, vol. 2, 1–3 (Bamberg: E.F. Kunz 1827 – Leipzig: Brockhaus 1831), 2,2: 741–43.

41 Vienna, Albertina, HO2006/668; [http://sammlungenonline.albertina.at/?query=Inventarnummer=\[HO2006/668\]&showtype=record](http://sammlungenonline.albertina.at/?query=Inventarnummer=[HO2006/668]&showtype=record) (accessed October 10 2014). A. Gnann, *In Farbe! Clair-obscur-Holzschnitte der Renaissance*, exh. cat. (Munich: Hirmer, 2013), 27, note 24. I am indebted to Christof Metzger, chief curator of the Albertina, for generously sharing his observations on the woodblock with me.

42 A. Weixlgärtner, 'Ungedruckte Stiche: Materialien und Anregungen aus Grenzgebieten der Kupferstichkunde', *Jahrbuch der kunsthistorischen Sammlungen des allerhöchsten Kaiserhauses* 29 (1910–11), 259–385, esp. 380.

43 M. Geisberg, 'Holzschnittbildnisse des Kaisers Maximilian', *Jahrbuch der Preussischen Kunstsammlungen*, 32 (1911), 236–48.

44 E. Savage, 'Jost de Negker's Woodcut *Charles V* (1519): An Undescribed Example of Gold Printing', *Art in Print* (July–August 2015), 9–15. Hans Weiditz (attr.), *Charles V between the Columns of Hercules*, woodcut in black and goldleaf on vellum with hand-colouring, 356 × 203 mm, 1519, printed by Jost de Negker in Augsburg (London, British Museum, 1858,0417.970); image available from <http://www.britishmuseum.org/research> (accessed 6 April 2013); Savage (formerly Upper), 'Glittering Woodcuts', 39–43.

woodcuts surviving in impressions with printed gold after Lucas Cranach's and Hans Burgkmair's initial exchange in 1507 and 1508 (in which the film of gold ink was substantially thicker and the gold printing was used for a different visual effect, showing highlights rather than tone). Also, all three were printed in Augsburg c.1520 or in the 1520s. For these reasons, Savage tentatively suggested an 'overlap of personnel' in their production.⁴⁵

Dürer in Chiaroscuro

As far as we know, Dürer's woodblocks remained in the possession of the Dürer family until the death of his sister-in-law Ursula Dürer in 1560. Although some were used to make new series of prints, no Nuremberg printer seems to have had the urge, permission or technical ability to produce chiaroscuro impressions of any of them. After Ursula's death, the remains of Dürer's workshop materials, including the woodblocks, were inherited by her niece Regina Alupeck, who was married in Prague.⁴⁶ Regina seems to have taken most of her inheritance with her to Prague, where she sold it. It is perfectly possible that some of the impressive collection of Dürer's copperplates in Holy Roman Emperor Rudolph II's *Kunstammer* were purchased from the Alupecks.⁴⁷ According to Adam von Bartsch, Rudolph II held the St Eustache plate in such high esteem that he had it gilded.⁴⁸ No such plate survived and the story is most probably another legend. It is, however, quite typical of the posthumous approach to Dürer and the general way in which his works were revered. On the one hand, the gilding can be interpreted as a symbol of the high esteem for the copperplate, which was considered one of Dürer's masterpieces; on the other hand it invests a workshop tool with an icon-like status by rendering it unusable or at least considerably altering the original appearance of the prints.

Also other contemporaries tended to manipulate Dürer's woodblocks and copperplates in order to enhance their material and aesthetic value. Most likely from another Alupeck sale, a number of Dürer woodblocks, already quite

worn out, turned up in Leyden, Amsterdam and The Hague, then centres of the Dutch printing industry, at the beginning of the seventeenth century. The prolific Hague printer and publisher Hendrik Hondius managed to acquire the block of one of Dürer's most famous woodcuts, the *Rhinoceros*.⁴⁹ He edited a number of impressions with a Dutch translation of Dürer's inscription and his own address: *Men vintse te coope by Hendrick Hondius Plaetsnyder in s'Gravenhage*.⁵⁰ He also owned the woodblock of *Varnbüler*, which he re-issued with the same address line (Fig. 15.4).⁵¹ Although Hondius reprinted a large number of older plates by other artists, the two Dürers are the only woodcuts in this group.



FIGURE 15.4 *Albrecht Dürer*, Portrait of Ulrich Varnbüler, dated 1522 in the block, printed by Hendrik Hondius in Amsterdam c. 1620, 43.3 × 32.6 cm

LONDON, BRITISH MUSEUM, E.3.26 © TRUSTEES OF THE BRITISH MUSEUM

45 Ibid., 43; see also 37–39, 42–43.

46 See Rupprich, *Schriftlicher Nachlass*, 3: 449–50.

47 See the edition of the inventory by R. Bauer and H. Haupt, 'Das Kunstammerinventar Kaiser Rudolfs II., 1607–1611', *Jahrbuch der Kunsthistorischen Sammlungen in Wien*, 72 (1976 = entire volume): 104–05. The copperplates were kept in a *Kästlin* (a small chest, drawer or cupboard).

48 B.VII: 73: *L'empereur Rodolphe II. en a fait dorer la planche* ('Emperor Rudolph II had the plate gilded').

49 On Hondius, see N. Orenstein, *Hendrick Hondius and the Business of Prints in Seventeenth-Century Holland*, Studies in Prints and Printmaking (Ouderkerk aan den IJssel: Sound & Vision Interactive, 1996).

50 On this version, see Meder, *Dürer-Katalog*, 254, no. 273 (=6th ed.) and, 199, no. 381–II.

51 Ibid., 238–239, no. 256.2 and 199, no. 380–II.

The woodblocks then came into the hands of Willem Janssen in Amsterdam.⁵² Janssen 'up-cycled' the two damaged blocks by turning them into parts of chiaroscuro woodcuts. Three different palettes are known of the *Rhinoceros*, to which Janssen added one tone block: olive, brown and dark green (Fig. 15.5). Janssen treated the *Varnbüler* in an even more sophisticated way, adding two tone blocks in light green, dark green and yellow-brown palettes with the key block in black or brown (Fig. 15.6).

Janssen's intervention is generally explained by his incentive to cover up the obvious damage of the key blocks. Three hundred years later, he was reproached by Anton Reichel for not only betraying Dürer's original artistic purpose, but also cheating his clients for his personal profit.⁵³ Leaving aside Janssen's business-minded wish to



FIGURE 15.5 *Albrecht Dürer, Rhinoceros, dated 1515 in the block, chiaroscuro impression by Willem Janssen in Amsterdam 1620s, 21.3 × 30.0 cm*
LONDON, BRITISH MUSEUM, 1877,0609.71 © TRUSTEES OF THE BRITISH MUSEUM



FIGURE 15.6 *Albrecht Dürer, Portrait of Ulrich Varnbüler, dated 1522 in the block, chiaroscuro impression by Willem Janssen, 1620s, 43.4 × 32.6 cm*
NUREMBERG, © GERMANISCHES NATIONALMUSEUM;
PHOTO: GEORG JANSEN

'smarten up (the) appearance' of the prints, as Giulia Bartrum wrote, one has to admit that he also managed 'to create a more pictorial image',⁵⁴ transforming Dürer's black-and-white masterpieces into printed paintings or wash drawings. It is no coincidence that their production coincided with a resurgence of popularity of wash drawings. Thus, the material and aesthetic transformation included a perceived change of media, which many contemporaries surely saw as an enhancement.⁵⁵

sense of the composition, was nothing else but a means to dissimulate the faults of the plates which were obvious to every connoisseur. For this reason these prints could not (as Passavant suggested) be considered to be the earliest examples of Netherlandish chiaroscuro prints. They owe their existence to economic strategies and have nothing to do with the aims of a true artist).

52 Ibid., 239, no. 256–3, 254, no. 273 (=7th ed.). Both prints bear the address *Ghedruckt t'Amsterdam by Willem Janssen in de vergulde Sonnewyser*; see N.A. Bialler, *Chiaroscuro Woodcuts: Hendrick Goltzius (1558–1617) and His Time*, exh. cat. (Amsterdam: Rijksmuseum; Ghent: Snoeck-Ducaju, 1992), 84–86, nos. I, J. About woodcuts by Hendrick Goltzius 'up-cycled' to chiaroscuro by Janssen see M. Leesberg, 'Hendrick Goltzius's Chiaroscuro Woodcuts', this volume, 167–68.

53 Reichel, *Clair-Obscur-Schnitte*, 43: 'Den Verlegern, die die ausgedruckten Holzstöcke Dürers verwerten wollten, war die Tonplatte, die dem Geiste der Komposition völlig widerspricht, nichts anderes als ein Mittel, um über die jedem Kenner offenkundigen Schäden der Platten hinwegzutäuschen. Es können deshalb diese Drucke nicht, wie Passavant vermutet, als die frühesten Proben des niederländischen Clair-obscur-Stiches angesehen werden. Sie verdanken Geschäftskniffen ihr Dasein, die mit künstlerischen Bestrebungen nichts gemein haben' (To the editors who wanted to use Dürer's worn out plates the tone block, which totally contradicts the

54 Bartrum, *Albrecht Dürer*, 287, no. 244. For innovative business strategies in the seventeenth-century print trade see E. Kolfin and M. Rikken, 'Colourful Topography', this volume, 207–15.

55 See Dackerman, *Painted Prints*; Eser and Grebe, *Heilige und Hasen*.

In contrast to the majority of modern Dürer scholars, one can suppose that early modern collectors valued Janssen's 'Dürer hybrids' for their specific aesthetic impact rather than perceiving them as rivals to Dürer's original prints. Their production coincided with the reissuing of Italian chiaroscuro woodcuts and the introduction of commercial chiaroscuro printmaking in France (*camaïeu*),⁵⁶ and the reissuing of 'normal' woodcuts and intaglio prints in monochromatic red ink is well known.⁵⁷ The original collectors presumably also possessed a black-and-white impression of the *Rhinoceros* or *Varnbüler* and appreciated the colour-printed impressions as rarities in their own right. This was very probably the case of one of the most prolific print collectors in the seventeenth century, the French printer and dealer Pierre Mariette II.⁵⁸ He even put his name and date ('PMariette 1669') on a chiaroscuro impression of the *Rhinoceros*.⁵⁹

Both Hondius and Janssen signed their Dürer reprints with their names. There are many impressions from their workshops, however, where the address line is missing, thus suggesting an original by Dürer himself. This led to some confusion among early scholars regarding the role of Dürer in the history of the chiaroscuro print. Of the many examples two are particularly prominent. In 1751, John Baptist Jackson, owner of a wallpaper manufactory in Battersea and a revivalist colour woodcut printmaker, published a treatise entitled *An Essay on the Invention of*

Engraving and Printing in Chiaro Oscuro, as practised By Albert Durer, Hugo di Carpi, etc. In the title he claims Dürer as one of the founding fathers of the chiaroscuro print without giving any further evidence.⁶⁰ Shortly afterwards, the German printmaker and biographer Georg Wolfgang Knorr mistakenly asserted that Dürer was one of the founding fathers of the chiaroscuro print in his *Allgemeine Künstler-Historie* of 1759, pointing to the Varnbüler portrait, which he rated as one of Dürer's most beautiful prints.⁶¹

Conclusions

Although few in number, colour-printed impressions of Dürer's woodcuts are far from marginal. Instead, the apparent contradiction between the puristic concept of the 'Apelles in black and white' on the one hand and the editing and collecting of coloured impressions of Dürer's prints on the other is an indication of the status and the function of early modern colour printing in general and of the neoclassical heritage of the historiography of graphic art. In contrast to many present-day scholars, contemporaries presumably valued the 'Dürer hybrids' for what one could call their 'serial uniqueness' and their own aesthetic qualities mainly based on their vivid colouring and the achievement of the printer who had 'upgraded' the formerly black-and-white woodcut.

56 On colour printing in early seventeenth-century France, see A. Dencher, 'The "Camaïeu" Print', this volume, 180–86.

57 A. Stijnman, *Engraving and Etching 1400–2000: A History of the Development of Manual Intaglio Printmaking Process* (London: Archetype; Houten: Hes & De Graaf, 2012), 45.

58 On the Mariette family, see K. Smentek, 'Pierre II Mariette, or the Mariette Dynasty Revisited', in *L'Estampe au grand siècle: études offertes à Maxime Préaud*, ed. P. Fuhring et al. (Paris: École nationale des chartes and Bibliothèque nationale de France, 2010); A.L. Walsh, 'Mariette', in J. Turner, ed., *The Dictionary of Art*, 34 vols. (London: Macmillan, 1998) 20: 415–16.

59 Berlin, Kupferstichkabinett, 4624–1827.

60 J.B. Jackson, *An Essay on the Invention of Engraving and Printing in Chiaro Oscuro, as practised By Albert Durer, Hugo di Carpi* (London: Millar, 1751).

61 G.W. Knorr, *Allgemeine Künstler-Historie oder berühmter Künstler Leben, Werke und Verrichtungen mit vielen Nachrichten von raren alten und neuen Kupferstichen* (Nuremberg: Bieling, 1759), 72.

The ‘Camaïeu’ Print in Seventeenth-Century Paris: On the Origins of Multi-tonal Printmaking in France

Alexander Dencher

In the final chapter of his seminal work *Traicté des manieres de graver en taille douce sur l'airin* (1645), the printmaker and theoretician Abraham Bosse discussed several ‘curiositez’ of printing techniques, including multi-tonal etchings published by the artist François Perrier in 1633 (Fig. 16.1). He praised these ‘figures of which the outlines and hatching were printed in black and the highlights in white, just like cameos’, which were so new and beautiful that ‘I was compelled to research their invention’,¹ before discussing their techniques, inks and paper. Although an important print industry was concentrated in Paris and Lyon, French printmakers produced only a small number of multi-tonal prints until the early eighteenth century. His assessment effectively summarised the situation of the French multi-tonal print in the early 1630s.

Bosse used the term ‘camaïeux’ to indicate prints whose tonal effect (but not necessarily palette) imitate that of carved gems or cameos, generally with one or two tone plates (in intaglio) or tone blocks (i.e. woodcuts) printed in a limited tonal range of any one colour.² Perrier, who combined one plate for the design in black (the key plate) with another for highlights in white on grey-brown paper that provided the intermediary tone, was a notable

1 ‘figures dont les contours & hacheures estoient imprimées de Noir & les rehauts de blanc, tout en forme de Camayeux; j’eus envie d’en rechercher l’invention’, A. Bosse, *Traicté des manieres de graver en taille douce sur l'airin* (Paris: Bosse, 1645), 74.

2 The term ‘camaïeu’ is used in this paper following the cited authorities. Later art historians, including the eighteenth-century woodcut printmaker and historian of woodcut printmaking Jean-Michel Papillon, have also called his woodcuts ‘camaïeux’: J.-M. Papillon, *Traité historique et pratique de la gravure en bois*, 2 vols. (Paris: Simon, 1766) 2: 372. See also M. Gravel, *La Gravure française à la renaissance à la Bibliothèque nationale de France*, exh. cat. (Paris: Bibliothèque nationale de France, 1995), 197. For the term’s primary definition in printmaking, see C. van Hasselt, *Clairs-obscur: Gravures sur bois imprimées en couleurs de 1500 à 1800 provenant de collections hollandaises*, exh. cat. (Paris: Institut Néerlandais, 1965), 7. On the development of the term in relation to ‘chiaroscuro’, see R. Verbraeken, *Clair-obscur: – histoire d’un mot* (Nogent-le-Roi: Jacques Laget, 1979), 65–66, 72. On its myriad contradictory definitions, see E. Savage, ‘Colour Printing in Relief’, this volume, 23–24.



FIGURE. 16.1 François Perrier, Hercules Farnese, 1633, etching from two plates printed in black and white ink on grey-brown tinted paper, 17.0 × 8.2 cm
PARIS, BIBLIOTHÈQUE NATIONALE DE FRANCE, DA 10

producer of these etchings. Their pictorial effects and restrained tonal range recall an earlier set of colour woodcuts designed by the painter Georges Lallemant (Figs. 16.3, 16.4), cut by the German artist Ludolph Büsinck and



FIGURE. 16.2 *Ludolph Büsinck, after Abraham Bloemaert, Holy Family c. 1620–23, colour woodcut from three blocks, 23.7 × 17.5 cm*
LONDON, BRITISH MUSEUM, 1873,0712.30; © THE TRUSTEES OF THE BRITISH MUSEUM

published in Paris 1623–30.³ Bosse does not mention them because his treatise deals specifically with intaglio printmaking, yet he must have been aware of their existence since his master, the influential engraver and print publisher Melchior Tavernier, published several of Lallemand's designs (Fig. 16.3).

In fact, all of the multi-tonal prints created in Paris during the first half of the seventeenth century could be termed *camaïeu* prints by this definition, which implies that the style may have developed as an artistic strategy specific to local printmakers. This is also suggested by the almost simultaneous appearance of woodcuts and etchings that conform to Bosse's definition of the *camaïeu* style in Paris during the late 1620s and early 1630s. A history of the origins and developments of colour printing in early seventeenth-century France must not only



FIGURE. 16.3 *Ludolph Büsinck, after Georges Lallemand, Saint Andrew, c.1623–30, colour woodcut from three blocks, 20.8 × 16.0 cm*
LONDON, BRITISH MUSEUM, 1860,0414.255; © THE TRUSTEES OF THE BRITISH MUSEUM

reconsider the works of Lallemand and Perrier but also the roles played by the German blockcutter Büsinck and the Flemish print publisher Tavernier. If the *Traicté* demonstrates the desire of printmakers like Bosse to develop and renew the medium of intaglio printmaking, demonstrated by his own attempts to (virtually) recreate the effects of Perrier's works (Fig. 16.5), its text simultaneously alludes to problems faced by contemporary Parisian printmakers eager to integrate colour into prints mechanically.

Abraham Bosse, Colour and Prints in Seventeenth-century France

The *Traicté* is the principal source of information on the status of colour in French intaglio print production during the early decades of the seventeenth century. However, as the supposed novelty of *camaïeu* intaglio printmaking shows, Bosse ignores important and relevant aspects of

³ Papillon, *Traité historique* 2: 372. See also *La Gravure française à la renaissance à la Bibliothèque nationale de France*, exh. cat. (Paris: Bibliothèque nationale de France, 1995), 197.



FIGURE. 16.4 Ludolph Büsinck, after Georges Lallemant
published by Melchior Tavernier, *The Flute Player*,
c.1627–30, colour woodcut from three blocks with
letterpress text, 25.9 × 21.1 cm
LONDON, BRITISH MUSEUM, 1856,1213.72; © THE
TRUSTEES OF THE BRITISH MUSEUM

colour print production that do not fit his ideological framework. Although Lallemant's woodcuts were the first 'multi-tonal' prints issued in France, colour had been a staple component of French woodcut printmaking since at least the fifteenth century.⁴

When Bosse's treatise was published in 1645, Parisian publishers and engravers met the demand for colour in prints in two ways. Coloured paper was used to provide the intermediary tone throughout the seventeenth century; some artists, like Paul Maupin in Lyon, who worked after designs by the French painter Jacques Stella (who was living in Italy at this time), printed a key block in black onto blue paper and subsequently brushed on leadwhite heightening. They are evidence of a singular effort outside Paris to



FIGURE. 16.5 Abraham Bosse, published by Herman Weyen,
Allegory of Hope, 1636 (possibly printed only
after 1645), etching from two plates printed in
black and white ink on grey-brown tinted paper,
7.4 × 4.8 cm
PARIS, BIBLIOTHÈQUE NATIONALE DE FRANCE, AD 534

incorporate colour into single-sheet prints. That they were printed in Lyon but designed in Rome suggests the continuing importance of Italian and Netherlandish models (see below) to French printmakers.

The majority of French prints with colour were painted or, more often, stencilled (*au pochoir*) by *imagiers* (woodcut publishers and blockcutters). They engaged anonymous artisans to cut popular images such as royal portraits, calendars and devotional images that could serve as wall decorations (many were framed with a printed border). They were coloured with vibrant hues, especially red, blue and green. The *imagiers*, who were concentrated in Paris on the Right Bank, supplied (hand-coloured) woodcuts to England and Spain throughout the sixteenth century. Although woodcut was ousted

4 On the technique of frisket printing used in France from the 1490s through the seventeenth century to print pictorial elements in books in black and red, see E. Savage, 'A Printer's Art', this volume, 94.

from Parisian workshops by copper engraving towards the end of the 1620s,⁵ the *imagiers* of the Rue Montorgueil (the centre of production) continued to export large quantities of stencilled prints to the Iberian Peninsula, and playing cards and maps were coloured *au pochoir* throughout the seventeenth century.⁶

The intaglio printmakers, including Bosse, worked mainly in Paris on the Left Bank. This community of engravers and publishers was initially dominated by a group of Flemish refugees and immigrants, like Tavernier, who had established themselves in Paris during the late sixteenth century. These artists, many from Antwerp, brought important technical knowledge and a more structured approach to intaglio printmaking to Paris.⁷ When Bosse disparagingly referred to the '*Enlumineurs ou Couoleurs d'estampes vulgairement dit Images*' (illuminators or colourers of prints commonly called 'images' [i.e., woodcuts]), he was characterising woodcut printmakers and their work as retrogressive.⁸ He also criticised the imprecision and (low) quality of woodcut hand-colouring in contrast to the neatness that could be achieved with multi-tonal etching.⁹

Although Bosse disparaged the methods of the *imagiers*, he recommended similar ways of integrating colour into prints. In particular, his suggestion of using coloured paper points to the undeniable dependence of *camaïeu* on the example of pre-existing woodcut models, even if Bosse did not mention this in the *Traicté*. He also proposed using colour inks for intaglio printing,¹⁰ but did not mention that this had already been practiced in printmaking workshops at Fontainebleau a century before, nor that those workshops had also produced chiaroscuro prints in a variety of colours.¹¹ The scarcity, or the irregular quality, of the Fontainebleau impressions may explain why Bosse did not mention them, and it suggests that printing in colour ink was not practised regularly.¹²

These historical examples provide solid evidence of the artistic and commercial interest in colour prints by French artists as well as French connoisseurs, but it seems no Parisian workshops creating multi-tonal woodcuts from multiple blocks were active until Buisinck's arrival in 1623. It is very likely that Netherlandish and Italian chiaroscuro woodcuts were sold in Paris and Lyon and provided initial models for French artists. This would explain the stylistic proximity of Buisinck's woodcuts to earlier Netherlandish chiaroscuro prints by Abraham Bloemaert and Hendrick Goltzius, who used tone blocks to indicate both broad areas of tone and narrow highlights like Buisinck (Fig. 16.3).¹³ The almost simultaneous appearance of multi-tonal woodcuts and etchings in Paris during the 1620s and early 1630s strongly suggests the local specificity of the *camaïeu* print. The contrast of Lallemant's late Mannerist designs to the modern Italianate, classicist style of Perrier's etchings is particularly telling and sheds light on the development of the Parisian *camaïeu* print.

Camaïeu Woodcuts and Etchings in Seventeenth-century Paris

Besides the chiaroscuro woodcuts that Italian artists of the School of Fontainebleau produced in the 1540s and 1550s,¹⁴ the woodcut prints executed by Buisinck after designs by Lallemant (Figs. 16.3, 16.4) were the first French prints whose tonal effects were achieved through printing. Each colour woodcut was printed using a key block and one or two tone blocks, sometimes with text in letterpress. The tone blocks were always printed in lighter and darker versions of the same colour, a characteristic of the *camaïeu* print as per engraved cameo stones.¹⁵ The majority of those designed by Lallemant depict religious and devotional subjects, including a series of Christ and the Twelve Apostles as well as Buisinck's first colour woodcut, *The Holy Family* (dated 1623, Fig. 16.2), which reproduces a drawing by Abraham Bloemaert.¹⁶ The few genre scenes (e.g. *Flute Player*, Fig. 16.4), were executed in an archaising style that recalls Goltzius' 'neo-Renaissance' prints after Lucas van Leyden and Albrecht Dürer.¹⁷ Buisinck's only depiction of

5 F. Rodari and M. Préaud, eds., *Anatomie de la couleur: L'invention de l'estampe en couleurs*, exh. cat. (Paris: Bibliothèque nationale de France; Lausanne: Musée Olympique Lausanne, 1996), 6, 20.

6 Rodari and Préaud, *Anatomie de la couleur*, 21, 23.

7 S. Welsh Reed, *French Prints from the Age of the Musketeers*, exh. cat. (Boston: Museum of Fine Arts, Boston, 1998), 6–7.

8 Bosse, *Traicté*, 72.

9 Ibid., 73.

10 Ibid., 71.

11 C. Jenkins, 'The Chiaroscuro Woodcuts of the Master ND at Fontainebleau', *Print Quarterly* 30.2 (June 2013), 138; D. Cordellier, *Luca Penni: un disciple de Raphaël à Fontainebleau*, exh. cat. (Paris: Musée du Louvre, 2012), 101–02.

12 Rodari and Préaud, *Anatomie de la couleur*, 28. Jenkins, *Chiaroscuro Woodcuts*, 138.

13 N. Bialler, 'Hendrick Goltzius and the Netherlandish Chiaroscuro Woodcut', 2 vols. (PhD diss., University of Michigan: Ann Arbor, 1983) 2: 130. On Goltzius's chiaroscuro woodcuts, see M. Leesberg, 'Hendrick Goltzius's Chiaroscuro Woodcuts', this volume, 163–71.

14 Jenkins, 'The Chiaroscuro Woodcuts'.

15 Van Hasselt, *Clairs-obscur*, 9.

16 Stechow, 'Buisinck', p. 397.

17 E. Reznicek, *Die Zeichnungen von Hendrick Goltzius*, 2 vols. (Utrecht: Haentjens Dekker & Gumbert, 1961) 1: 112–17.

classical iconography, *Aeneas Carrying his Father during the Flight from Troy* (1628–29), is also his only *camaïeu* printed with just one tone block.

It remains unclear how Büsinck, an artist from Münden in Lower Saxony, came to be employed by Lallemand, a painter from Lorraine working in Paris. Büsinck arrived in Paris around 1623, the date of his first work after Lallemand, and was back in Münden by 1630.¹⁸ It has been plausibly suggested on the basis of his first colour woodcut that he trained in Utrecht with Abraham Bloemaert, in whose workshop he may have learned this technique.¹⁹ Alternatively, the intermediary could have been Tavernier, who had engaged other Northern printmakers as apprentices and designers in Paris (including Crispijn de Passe the Younger).²⁰ Printmaking professionals like Büsinck and Tavernier probably helped Lallemand construct a press, as Papillon reports that he supposedly undertook several costly and unsuccessful attempts before succeeding.²¹

It appears likely that Tavernier, whose address figures on a number of impressions, was involved from the beginning of the collaboration between Lallemand and Büsinck. The stylistic similarity between the early and late prints as well as Lallemand's paintings from this time confirms this hypothesis.²² This collaborative scenario also corresponds to the classical division of labour in the print workshop: Lallemand as designer, Tavernier as overseer and Büsinck as printmaker or woodcutter. In any case, Tavernier must have eventually recuperated Lallemand's printing presses to print those works bearing the address of his boutique/workshop A l'Espic d'Or (Fig. 16.3).²³ Alternatively, this could imply that they were produced towards the end of Büsinck's Parisian sojourn since Tavernier moved to L'Espic d'Or in 1627 and then to the Sphère royale in 1635.²⁴ More importantly, Tavernier's involvement suggests that Lallemand's woodcuts were more successful than has been previously thought; it is unlikely that the astute

publisher, whose father had supposedly introduced intaglio printmaking in Paris,²⁵ would acquire an expensive printing press and old-fashioned designs if they were not commercially viable. However, if Tavernier was one of the creditors mentioned by Papillon who confiscated the presses to cover Lallemand's debts,²⁶ this would implicate him in the development of French colour printing.

It has been proposed that French printmakers returning from Italy with new techniques may have motivated Lallemand's interest in prints.²⁷ This rings true for Perrier, who travelled to Italy and joined Simon Vouet's atelier in 1630, but less so for Lallemand, considering the stylistic proximity of his woodcut designs with works by Goltzius and Bloemaert as well as his choice of a Northern block-cutter. Furthermore, Lallemand's choice of woodcut came at a time when this medium was being displaced by intaglio printmaking.²⁸ The painter's apparently costly venture was an innovative continuation of the medieval tradition of the devotional woodcut. His circle of clients was largely composed of ecclesiastic patrons, such as the Cardinal François de La Rochefoucauld. This may explain the predominantly religious nature of the images cut by Büsinck, which also corresponds to Lallemand's other work of this period: paintings for important churches and abbeys, including eight for the abbey-church of Sainte Geneviève, Paris, in 1625–36.

It is unclear how contemporary print amateurs and collectors reacted to Lallemand's artistic initiative, since all known sources that mention the woodcuts are significantly later. The Abbé Michel de Marolles mentioned '*figures*' by Lallemand in Büsinck's '*clair obscur*' woodcuts but compared other, unspecified works unfavourably to those by Pierre Brebiette and Michel Dorigny.²⁹ By speaking of *clair-obscur* rather than *camaïeux*, Marolles assimilates the aesthetic of the multi-tonal prints to a critical vocabulary closely associated with painting and also with sixteenth-century Italian *chiaroscuro* woodcuts.³⁰ But apart from Papillon, who praised Büsinck's blockcutting technique,³¹ later assessments of Lallemand's manner were consistently unfavourable. Papillon's contemporary Jean Pierre Mariette judged 'his manner poor and tasteless, but nevertheless he had a [good] reputation and was

18 W. Stechow, 'Ludolph Buesinck: A German Master of the Seventeenth Century', *Print Collectors' Quarterly* 25 (1938), 397–99; W. Stechow, 'Catalogue of the Woodcuts by Ludolph Büsinck', *Print Collectors' Quarterly* 26 (1939), 349–59.

19 Stechow, 'Buesinck', 411–13.

20 I. Veldman, *Crispijn De Passe and His Progeny (1564–1670): A Century of Print Production* (Ouderkerk aan den IJssel: Sound & Vision, 2011), 258–71.

21 Papillon, *Traité historique et pratique* 2: 372–73.

22 Stechow, 'Buesinck', 411–13.

23 Stechow, 'Buesinck', 398.

24 A. Blum, *Abraham Bosse et la société française au dix-septième siècle* (Paris: Morancé, 1924), 5; J. Pannier, review, 'André Blum, Abraham Bosse et la société française au XVII^e siècle', *Bulletin historique et littéraire de la Société de l'histoire du protestantisme français* 74 (1925), 228.

25 Welsh Reed, *French Prints*, 6. See also M. Grivel, *Le commerce de l'estampe à Paris au XVII^e siècle* (Geneva: Droz, 1986), 46–47.

26 Papillon, *Traité historique et pratique*, 2: 373.

27 Welsh Reed, *French Prints*, 4.

28 Welsh Reed, *French Prints*, 6–7.

29 M. de Marolles, *Le livre des peintres et graveurs*, nouvelle édition (Paris: Jannet, 1855), 30, xxxv.

30 See also Verbraeken, *Clair-obscur*: 77.

31 Papillon, *Traité*, 1: 406–07.

regularly [lit. strongly] employed... Various artworks by him survive, amongst which *clairs-obscurs* that do not contradict what I have suggested'.³²

On the other hand, the *camaïeu* etchings designed and engraved by Perrier seemed to have been well received by artists like Bosse and collectors like the Abbé de Marolles. Marolles, who spoke highly of the '*grand peintre et graveur*' (great painter and engraver), owned copies of all of Perrier's *camaïeu* etchings (now in the Bibliothèque nationale de France, Paris).³³ He also praised Perrier's etching skills and a book 'so beautiful that a brilliant torch illuminates it throughout',³⁴ which must be one of two anthologies of classical statuary and bas-reliefs, *Segmenta Nobilium Signorum et Statuarum* (1638) and *Icones et segmenta* (1645), which had been illustrated with Perrier's etchings.

A substantial part of the appeal of Perrier's multi-tonal etchings must lie in their classical subject matter as well as their modern style, for in technical terms they represent a rather modest attempt at integrating colour (from the paper) into prints. The tonal variety is more restrained than in Lallemant's woodcuts, and the independence of the key plate from the highlight plate means that the pictorial effects achieved by the white heightening, which suggest the luminous marble of the statues Perrier had seen in Rome,³⁵ are optional rather than integral to the design. Bosse may have considered that a commercial and technical advantage. Marolles focuses on the subject matter of the etchings and, unlike Bosse, does not mention their colour printing. Similarly, when Mariette mentions Perrier's etchings, he focuses on the representations of classical statuary and bas-reliefs but considers the artist 'not very accurate at drawing'.³⁶

Although the preparatory drawings for the etchings of classical statues were executed during Perrier's first stay in Italy, the date suggests that they were etched when he was back in France. The apparent success of his *camaïeu* etchings may explain why he engraved a significantly larger one, the allegory *Time Cropping Love's Wings* (1633). It carries a royal privilege indicating it was

designed and etched by Perrier. That neither Marolles nor Mariette mention this later print, whose tonal effects are significantly more visible than those of the earlier etchings, reinforces the notion that the fame of Perrier's etchings is based on their classical subject matter, not their printing technique.³⁷ This is also suggested by Mariette, who may not have known the dated *camaïeu* etchings, as he situated Perrier's etchings after antiquities during the artist's second Roman stay in 1638–45. Furthermore, it is significant that Perrier's etchings of classical statues, whether in *camaïeu* or monochrome, account for almost half of the seventeenth-century French prints after antique sculptures.³⁸

If Bosse was attracted to Perrier's etchings for their subject matter, he does not state this explicitly but insists on their originality and beauty. It was the combination of their visual appeal and technical novelty that compelled Bosse, as he stated in his treatise, to research their 'invention'. As Sue Welsh Reed pointed out, Bosse may have attempted his own *camaïeu* etchings (*Theologicarum ac cardinalium virtutum icones*, a series of eight allegories of the cardinal and theological virtues with a dedication plate and a title plate)³⁹ after the appearance of Perrier's prints (Fig 16.5).⁴⁰ Although Bosse's Virtues are significantly smaller than Perrier's etchings, an almost identical technique is used to achieve the desired *camaïeu* effect. In both cases grey-brown paper provides the intermediary tone and colour plates are used for the white heightening. The *Virtues* were also printed from the line plate only, in black.⁴¹

Bosse's account also points to other problems in the history of multi-tonal printing in France. On the pages before he theorises on Perrier's manner, he outlined his own colour printing technique for printing on satin (*Stampes ou Images de satin de plusieurs couleurs*), for which he was granted a privilege in 1637.⁴² Using the example of a human figure

32 'Sa manière étoit pauvre et sans gout, et cependant il étoit en réputation et fort employé... On a de lui divers ouvrages, et entr'autres plusieurs clairs-obscurs qui ne contrediront pas ce que j'avance', J.-P. Mariette, with C.-P. de Chennevières-Pointel and A. de Montaignon, *Abecedario de P.J. Mariette et autres notes inédites de cet amateur sur les arts et les artistes*, 6 vols. (Paris: Dumoulin, 1851–60) 3: 54.

33 Marolles, *Livre des peintres et graveurs*, 25; VII–VIII.

34 'si beau qu'il éclaire partout un brillant flambeau', Marolles, *Livre des peintres et graveurs*, 25, VIII.

35 Rodari and Préaud, *Anatomie de la couleur*, 43.

36 'peu correcte dans le dessin', Chennevières-Pointel and Montaignon, *Abecedario* 4, 111.

37 On the use of new colour printing techniques to celebrate classical imagery in the Netherlands around the same time, see E. Wouk, "Divine, August and Immortal", this volume, 151–60.

38 P. Cadet, 'Les estampes françaises du XVIIème siècle d'après les bas-reliefs antiques', *Gazette des Beaux-Arts* 112 (1988), 250.

39 Blum, *Abraham Bosse*, 21–22, nos. 142–50.

40 S. Welsh Reed, 'Abraham Bosse: Exemples de ses eaux-fortes "en forme de Camayeux"', *Nouvelles de l'Estampe* 132 (1993): 40–42. However, the precise dating of these bi-colour impressions requires further research in order to determine whether Bosse actually supervised their printing. See A. Stijnman, *Engraving and Etching 1400–2000. A History of the Development of Manual Intaglio Printmaking Processes* (London: Archetype; Houten: Hes & De Graaf, 2012), 357–58.

41 Rodari and Préaud, *Anatomie de la couleur*, 43.

42 *Lettres patentes qui permettent aux sieurs Abraham Bosse graveur en taille douce, et Charles delafont[aine] d'imprimer [en couleurs] sur toutes estoffes de soje, papier, velin parchemin, cuir, etc.* (Paris,

one would like to 'dress' in different colours, Bosse recommended using a second plate of exactly the same dimensions as the line plate covered in the hard, transparent varnish (*vernis dur*) he had described. A fresh impression would be exactly positioned on the varnish on the second plate and the whole run through the press, making a counterproof on the varnish. The outlines of the design would be traced with an etching needle through the varnish and the plate etched shortly. A number of impressions of the second plate would be made and dried. Then the different colours would be brushed onto this impression where suitable, for example 'the grey hat, the slightly brown hair, the red coat'.⁴³ A coloured impression would then be placed face up on top of the felt on the bed of the press. The first plate would be positioned within the embossment of the coloured impression, covered with two or three blankets, and the whole run through the press. Although Bosse's detailed instructions imply that he may have practised these techniques himself, no such works are known. (One wonders whether Bosse's method isn't more cumbersome and time consuming than 'normal' illumination.)

If the *Traicté* indicates the experimental nature of Bosse's own *camaïeu* etchings, it simultaneously expresses his desire to renew and develop the capacity for the pictorial effect of his preferred medium. Bosse was concerned with elevating the status of printmakers from artisan to artist. If this could have been achieved by the artist's choice of medium, the case of *camaïeu* demonstrates that subject matter and style also played a significant role. Bosse's repeated insistence on the importance of the regularity and quality of each impression, which he assiduously emphasised as resulting from meticulous observation of the technical process described in his treatise, also characterises his later discourses on the science of perspective.

Conclusion

These three individual but interrelated case studies highlight several key issues of the history of the origins and development of colour printing in France, specifically tonal woodcut and etching. When Büsinck arrived in Paris in 1623, single-sheet woodcuts printed by the *Imagiers*

were commonly painted or stencilled. Printmakers working in Paris and Lyon were familiar with contemporary Netherlandish and Italian chiaroscuro woodcuts and possibly with the chiaroscuro woodcuts produced by the Fontainebleau workshops in the 1540s. However, Bosse's account in the *Traicté* confirms that the production of printed multi-tonal images was not yet a fully established artistic practice in French workshops in the mid-seventeenth century.

The collaboration between the designer Lallemant and woodcutter Büsinck, probably mediated by Tavernier, produced the first French multi-tonal prints, and their tonal effects were achieved through an integrated printing process. Around 1630 woodcut was superseded by intaglio and effectively disappeared from the Parisian printmaking scene, but the use of coloured paper and a restrained tonal range continued to inform Perrier's and Bosse's multi-tonal etchings. The shift from woodcut to etching around this time is attested throughout Europe, but in Paris it is also an expression of a new tendency towards academic pictorial practice, traditionally dated to Simon Vouet's return from Rome in 1627. Vouet's atelier eventually supplanted that of Lallemant as the largest and most productive in Paris.⁴⁴

The *camaïeu* prints by Lallemant and Perrier constitute innovative and original contributions to Parisian printmaking in the early seventeenth century. If Bosse does not mention Lallemant's woodcuts, as the *Traicté* is principally concerned with intaglio, their similarities with Perrier's later etchings are revealing. The *camaïeu* woodcuts' technique and restrained tonal variety provided a template for later etchers like Perrier and Bosse. Tavernier's acquisition of the press and Lallemant's blocks also indicates that the woodcuts had not been as unsuccessful as later authors implied and that *camaïeu* printmaking was not a singular experiment but an artistic strategy developed by Parisian printmakers to compete with sophisticated colour-printed woodcuts and intaglio prints by foreign artists.

Bosse consistently emphasised the distinction between the art of printmaking and the mere trade practised by woodcutters in the *Traicté*, which was aimed at professional printmakers and amateurs of prints alike. Whilst also demonstrating Bosse's concern for the advancement of the status of printmaking and the (colour-printed) print as a work of art, his descriptions highlight his attention to technical details and the neatness of each impression as well as the innovative strategies he proposed to distinguish tonal art from coloured craft.

6 January 1637), Bibliothèque Nationale de France, Paris, Coll. Delamarre, Ms. Fr. 21732, fol. 138^r–41^v. Another copy: Archives Nationales, Paris, Autres series, 06.01.1637.XIa 8653, fol. 83. Bosse, *Traicté*, 72–73. For a transcription see A. Blum, *Abraham Bosse et al. scoliété française au dix-septième siècle* (Paris: Morancé, 1924), 187–88.

43 'le chapeau gris, les cheveux un peu bruns, le manteau rouge', Bosse, *Traicté*, 73.

44 A. Mérot, *La Peinture française au XVIIe siècle* (Paris: Gallimard-Electa, 1994), 54.

PART 5

Product Innovation and Commercial Enterprise, c.1620 –1700

∴

On Hercules Segers's 'Printed Paintings'

Jun Nakamura

This chapter takes its name from a curious parenthetical offered by Samuel van Hoogstraten in a short biography on Hercules Segers published in his *Inleyding tot de hooge schoole der schilderconst* (1678):¹ 'though he had painted and printed on his shirts and the sheets of his bed (for he also printed paintings), he remained in extreme poverty with his whole family'.² The context suggests that Hoogstraten considered them 'printed paintings' because Segers's prints were on fabric rather than paper, but his innovations included more than simply switching the support. New etching and drypoint techniques allowed him to print tone in unprecedented ways and even to brush (rather than scratch) lines onto the plate. He further blurred the boundaries between print, drawing and painting by experimenting with coated papers, coloured inks, over-painting and varnishing. Scholarship has heretofore given Segers's use of printed colour only a cursory treatment. This chapter brings to the fore his unprecedented technical innovations in colour printing and contextualises them within his broader printmaking practice.³

Plate-Making Processes

Segers's unique ways of producing mid-tones in his etchings contributed to their painterly effects. The simplest of these was his use of drypoint. In order to create tonal areas additional to the etched linear design, Segers used very fine parallel drypoint hatching to raise burrs. These hold ink after wiping,⁴ but impressions are limited because

they wear down quickly. His use of drypoint to roughen the plate's surface and create soft areas of tone echoed its use in the earliest engravings of the fifteenth century and foreshadowed its later use by Rembrandt.

In pursuit of tone, Segers also applied two variations of what could be called a proto-aquatint process with which he etched both black lines and large areas of grey tone, effectively printing images in black, grey and white (from the paper). For the first, he coated a previously etched plate with ground, then finely crosshatched areas between the already-etched outlines and bit the plate twice, adding hatching between the bites to create two tones.⁵ For the second, Segers coated the plate in ground, covered it in dense and fine cross-hatching, blocked out areas to remain white (e.g., highlights) by brushing on a liquid stop-out varnish, briefly etched the plate to create hatched areas of tone, cleaned it, covered it again in ground and finally etched deeper line work over the grey areas.⁶ The grey areas wore down quickly due to the all-over lines and shallow biting, limiting the number of impressions he could pull.⁷

Another of Segers's innovations was the lift-ground process, which died with him and was not again developed until the mid-eighteenth century.⁸ With pen or brush he applied a water-soluble solution – perhaps sugar water – to the plate, which was left to dry and subsequently coated with ground. The plate was submerged in a bath of warm water to dissolve the solution, lifting the lines in negative from the ground. The plate was then

1 S. van Hoogstraten, *Inleyding tot de hooge schoole der schilderconst: anders de zichtbaere werelt* (Rotterdam: Francois van Hoogstraten, 1678).

2 'want schoon hy zijn hemden en de lakens van zijn bedde verschilderde of verdrukte (want hy drukte ook Schildery) hy bleef in d'outerste armoede met zijn gansche gezin'; Van Hoogstraten, *Hooge Schoole*, 312. Translation adapted from E. Haverkamp Begemann, *Hercules Segers: The Complete Etchings* (Amsterdam: Scheltema & Holkema; The Hague: Nijhoff, 1973), 23–24.

3 An exhibition on Segers will take place at the Rijksmuseum, Amsterdam, and the Metropolitan Museum of Art, New York, in 2016 and 2017.

4 For states with drypoint hatching, see (from Haverkamp Begemann, *Hercules Segers*) HB 4^{II}, 6^{II}, 10^{I-II}, 13^{II-III}, 36 and 47^{II}.

5 See HB 22^{IV}, and 25^{IIc}.

6 The technique is identifiable by a hatched 'halo' around the subject, usually in the sky. See HB 1, 12, 20, 22, 34, 45, and 46, and perhaps HB 41, 42, 48, and 49.

7 Most prints executed in this style survive in one or two impressions (HB 1, 12, 18, 34, 41, 42, 48, and 49), so plate degradation is difficult to demonstrate. The rough surface of the plate can be likened to the quickly-worn mezzotint or the rapid wear of Rembrandt's prints with densely hatched fine lines. E. Hinterding, 'Watermark Research as a Tool for the Study of Rembrandt's Etchings', in E. Hinterding, G. Luijten and M. Royalton-Kisch, *Rembrandt the Printmaker*, exh. cat. (Chicago: Fitzroy Dearborn, 2000), 33.

8 A. Stijnman, *Engraving and Etching 1400–2000: A History of the Development of Manual Intaglio Printmaking Processes* (London: Archetype; Houten: Hes & De Graaf, 2012), 217.

etched and printed in the normal manner, resulting in impressions that resemble pen and ink drawings.⁹

Colour Printing Processes

Though Segers's tone-producing techniques may have created more painterly prints, he had to develop a separate arsenal for producing colour. The simplest technique involved printing in a colour ink, which he did more often than any of his contemporaries; of the 183 impressions listed in Egbert Haverkamp Begemann's catalogue raisonné, almost two-thirds are described as having been printed in colours other than black, with sixty-six in black, fifty-two in green, thirty-six in blue, eleven in brown, ten in grey and eight in white or yellow.¹⁰ There is a variation of hues within each colour, and Segers's palette is usually unsaturated and requires qualifiers like 'dark' or 'bluish'. The combination of colour inks with his tonal techniques augmented the range of values achieved from a single colour of ink; several tints of green or blue may be found in one impression. In a few instances Segers employed more complicated processes, such as printing with more than one colour or with light ink on a dark support (see below).

Segers's oeuvre is marked by a great amount of monochrome printing in various colours on various coloured supports. Though others had printed intaglio in colour prior to Segers, the practice was by no means common and he produced far more colour intaglio prints than any of his contemporaries or predecessors.¹¹ The only local antecedents in his lifetime are *chiaroscuro* woodcuts, such as those produced by Hendrick Goltzius in Haarlem in 1588–90 (around the time of Segers's birth there) and re-printed well into the seventeenth century,¹² but no Netherlandish producer of *chiaroscuro* woodcuts seems to have printed engravings in colour.¹³ Segers's colour intaglio printing was a largely independent development.

White-line Impressions

Segers also printed intaglio in negative monochrome, that is, with light ink on a darker support.¹⁴ Images printed in negative prior to the twentieth century are few and isolated. The two known instances in intaglio before Segers seem to have been unique experiments. In the mid-1460s in Germany, the Master E.S. printed *The Madonna with Child in a Garden* in white ink on prepared black paper, of which five impressions survive,¹⁵ and a single red-wax cast of a family genealogy was taken from an engraved plate inked in white in Württemberg around 1590–1600.¹⁶ Thus, the known corpus of white-line intaglio prior to Segers amounts to half-a-dozen objects from two plates. It is improbable that Segers knew these examples, and must have developed the technique himself.

Segers's white-line etchings were clearly designed to be printed in light ink. His two seascapes, HB 48 and 49 (Fig. 17.1), feature a rough sea filled with white crested waves, a clear indication of his intentions. In them, he hatched the entire plate in order to get large areas of mid-tone and worked up some areas in reverse so that, when printed, the support would show through as a dark line. This is apparent in the outlines of the bricks in the *Ruins of the Abbey at Rijnsburg: Large Version* (HB 46). These white-line prints differ from the lights of *chiaroscuro* woodcuts because those typically use the white of the paper to act as highlight. Even when a high-light block was printed, as in Lucas Cranach's *St George* (1507) (Grebe, Fig. 15.1) or the earliest impressions of Hans Burgkmair's *Emperor Maximilian on Horseback* (1508), the lights are simply highlights and do not contribute to the outline.¹⁷ In Segers's white-line etchings, there is no dark key block; rather, the image is entirely described in negative.

9 HB 14 and 26, and perhaps HB 23, 32 and 33, are in this method.

10 In this study, 'black' includes inks described as 'brownish-black' and 'greenish-black'. Following Haverkamp Begemann, blue-grey is considered as grey, grey-blue as blue, etc.; the colour definitions, and thereby the count, must remain subjective until technical examination has been undertaken.

11 For fifteenth and early sixteenth-century colour intaglio prints, see Stijnman, *Engraving and Etching*, 69, nt. 180. See also A. Stijnman, 'Colour Printing in Intaglio', this volume, 42–46.

12 See M. Leesberg, 'Hendrick Goltzius's Chiaroscuro Woodcuts', this volume, 163–71.

13 Goltzius did, however, print his *Adoration of the Magi* in greyish-black, mixing lead white into his ink to imitate the quality of Lucas van Leyden's ink; K. Schenck, 'Goltzius's Use of Grey

Ink', *Print Quarterly* 15 (1998), 186–90; He (and others) also printed engravings in black over impressions of woodcut tone blocks. Stijnman, *Engraving and Etching*, 368–69.

14 There are five subjects in 'negative': HB 16 (one impression), HB 20 (one), HB 46 (six), HB 48 (one), HB 49 (one). I use 'white-line intaglio' to mean any image where the etched or engraved lines are printed in an ink that is lighter than the support, thus not necessarily white inks.

15 Stijnman, *Engraving and Etching*, 341; A. Griffiths, 'White Ink', *Print Quarterly* 8 (1991), 289. Griffiths notes six impressions, but one was likely the National Gallery's (1961.17.60), later shown to be a nineteenth-century facsimile.

16 Stijnman, *Engraving and Etching*, 330, fig. 270.

17 N. Bialler, *Chiaroscuro Woodcuts: Hendrick Goltzius (1558–1617) and his Time*, exh. cat. (Amsterdam: Rijksmuseum, 1992), 13, 17, cat. no. B; see A. Grebe, 'Dürer in Chiaroscuro', this volume, 171–173; A. Klein, 'Hans Wechtlin', this volume, 103; E. Savage, 'Colour Printing in Relief', this volume, 27–28; E. Savage, 'A Printer's Art', this volume, 27–28.

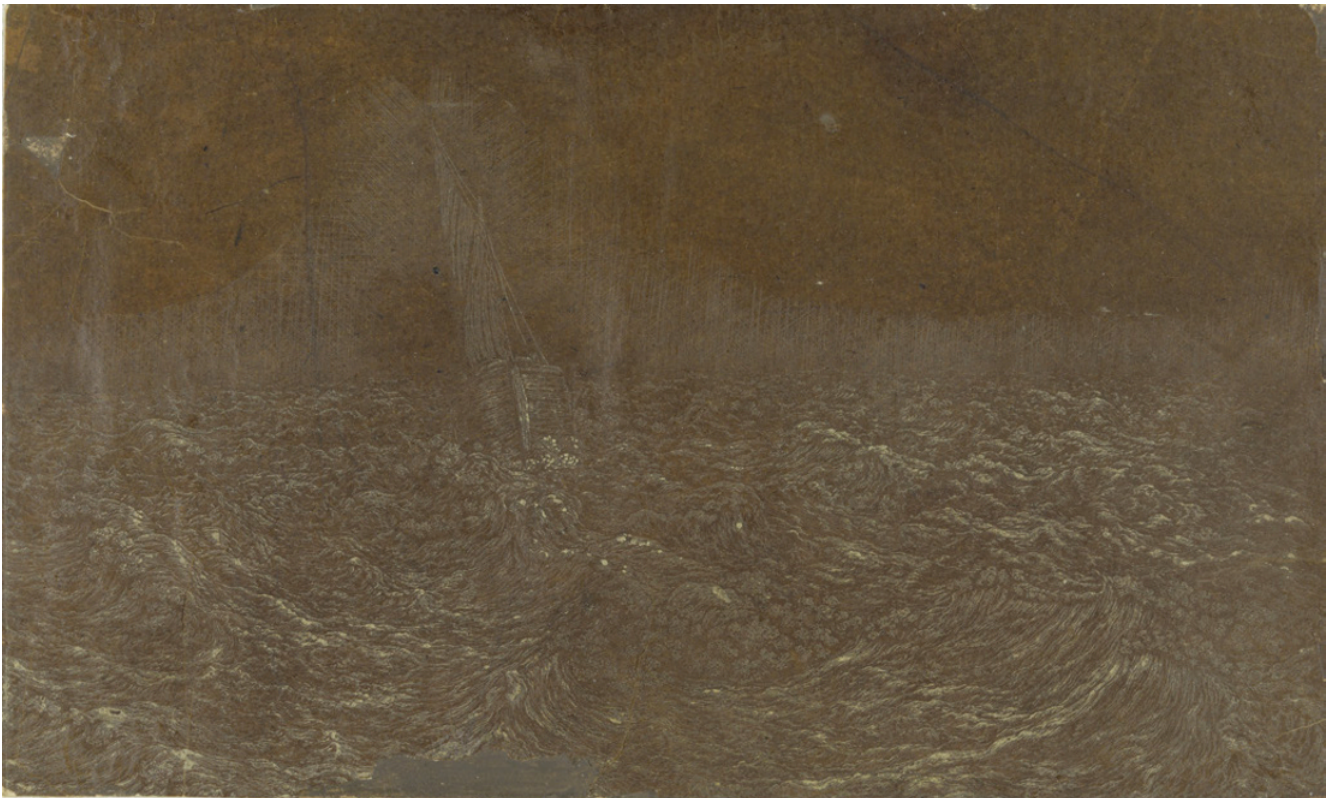


FIGURE. 17.1 *Hercules Segers, Ship in Rough Water (HB 48), c.1615–30, etching printed in pale yellow ink (perhaps originally white) on paper prepared with brown watercolour, 10.2 × 17.0 cm*
AMSTERDAM, RIJKSMUSEUM, RP-P-H-OB-864

Multi-Plate Printing

There is one surviving impression, HB 25 ^{1b} (*Road Skirting a Plateau, a River in the Distance*, Fig. 17.2), in which Segers printed two plates in different colours, light and dark, on prepared paper to create a three-colour image. It is possible that Segers took inspiration from chiaroscuro prints or drawings on blue paper heightened with white. Goltzius printed impressions of the woodcut series *Four Small Landscapes* (c.1600) in black ink on blue paper and heightened the prints in white by hand, similarly emulating drawings in this style.¹⁸ As mentioned above, printed highlights are found in woodcuts produced in the circle of Emperor Maximilian I in Wittenberg and Augsburg in 1507–08, in which a key block was printed in black with a highlight block in white, gold or other metals. However, Segers took the unprecedented step of printing two intaglio plates in register to create a fully integrated polychrome image. The only prior intaglio example is a text plate inked and printed on top of a framing device in

Leipzig in 1613, but one plate is strictly text and the two are not well integrated.¹⁹

It is unclear how Segers registered his plates so that the printed highlights aligned with the 'key' plate. The difficulties are manifold. Though registration marks could have been drawn on the paper, they were more likely drawn on the press bed or on a sheet of paper on top of the bed, which allows for better alignment.²⁰ Given Segers's reputation for messy prints and indications of a haphazard workshop practice, HB 25 ^{1b}'s two plates are remarkably well aligned.²¹ An unprinted line along the left edge of the tree branch in the foreground at bottom right indicates negligible misalignment, perhaps due to the paper stretching when run through the press the second time. Segers's single surviving exploration of printing in

18 Others also did this. See Bialler, *Chiaroscuro Woodcuts*, 174–75, nos. 50 ^{1b}, 53 ^{1b}, 55 ¹, 57, 60 ¹ and fig. 96.

19 Title page to the fourth part of Heinrich Zeising's *Theatrum machinarum* (Leipzig: Hennig Grossen der Jüngern, 1613); Stijnman, *Engraving and Etching*, 355, fig. 287.

20 Ibid., 356.

21 On Segers's messiness, see J. Nakamura, 'A Private Practice: Hercules Segers and the Market for Prints' (MA thesis, Southern Methodist University, 2013), Chapters 3 and 5.



FIGURE 17.2 *Hercules Segers, Road Skirting a Plateau, a River in the Distance (HB 25 1b), c.1615–30, etching printed from two plates, one in black ink and the other in pale yellow ink, on paper prepared with dark blue watercolour, 14.3 × 10.5 cm*
AMSTERDAM, RIJKSMUSEUM, RP-P-H-OB-800

register can be considered successful, so it is curious that he continued to work and print the key plate separately in a later state (HB 25 11c).

It was thought that in one instance Segers employed the use of what is now called *à la poupée* printing, selectively wiping multiple colours on a single plate.²² *Landscape with Pointed Rock and Forked Tree* (HB 16, Fig. 17.3) appears as if the plate were wiped with blue-grey ink in the background and green ink in the foreground.²³ However, this effect could have also been achieved through hand-colouring, which technical examination could elucidate. The difficulty in visually distinguishing what is printed and what is painted is significant, especially given Van Hoogstraten's reference to 'printed paintings'. The effect is enhanced

because some thirty-five impressions of Segers's prints are on cotton or linen,²⁴ and about a dozen are varnished;²⁵ both are atypical practices for printmaking though common in painting.

Never the Same Print Twice

Segers usually used colour printing in conjunction with hand-colouring to create 'printed paintings', and it is thus not useful to completely separate the two processes. Like paintings and drawings, Segers's prints are unique objects. Nearly every print is individualised in some way – whether by hand-painting, using different supports and preparations, over-painting, varnishing, cropping or printing in various coloured inks. One could almost say he never made the same print twice. In only a few instances is there more than one impression of a print in the same ink on the same support treated in the same way – the standard approach for his contemporaries.²⁶ Twenty-two of Segers's fifty-four plates survive in a single impression, and impressions from the same plate can be unrecognisably different. Of the five surviving impressions of *River Valley with a Waterfall, Version I* (HB 21), none are printed in the same ink, on the same prepared support, or overpainted in the same way. They are also different states and cropped differently. Segers's authorship in cropping and hand-colouring is doubted in a few instances, but the majority of these interventions are believed to be by Segers himself.²⁷

Despite Segers's practice of varying individual impressions, he also faithfully repeated compositions on separate plates, sometimes transferring the prior image directly to a new plate and working it again with (sometimes subtle) changes. This process results in compositional duplicates that have at times been mistaken for multiple states of a single plate, such as the two versions of *Landscape with Pointed Rock and Forked Tree* (HB 15 and 16; Figs. 17.4, 17.3).²⁸ There are other instances where a composition was copied

22 Haverkamp Begemann, *Hercules Segers*, 74; Stijnman, *Engraving and Etching*, 347–48, fig. 28o.

23 This will be discussed in greater detail in the forthcoming Segers exhibition.

24 HB 13 1a–i, 13 11o, 15 1a, 17 1a, 19 a, 21 1a, 27 1c–d, f, g, k, o, 28 a–b, 35 a–c, 40, 41, 47 1a–d, 52, 53 and 54 a–b.

25 HB 8 a, 10 11d (?), 21 111d, 22 1a, 23 1b, 26 c (?), 27 1d (?), m, 27 11p, 31 a, 35 c, 46 a and 49.

26 HB 6 11e–f, 26 a, d, 27 1h–i, 43 a–b, 44 a–b, 46 b–c, f, 47 1b–c and 50 a–b. Many of these examples are cropped differently, varying the composition.

27 The manuscript note on the verso of HB 14 1a shows that a former owner cut the upper edge of the print, thereby removing part of the inscription, which he copied underneath. See also the ink wash on HB 22 11g, probably by a later hand.

28 Other 'compositional duplicates' are HB 19 and 20, 21 and 22, and 23 and 24. J. Springer, *Die Radierungen des Herkules Seghers*



FIGURE. 17.3 *Hercules Segers, Landscape with Pointed Rock and Forked Tree (HB 16), c.1615–30, etching printed in light blue ink and (apparently) light green ink on paper prepared with dark brown body colour, 10.2 × 18.0 cm*
AMSTERDAM, RIJKSMUSEUM, RP-P-H-OB-816

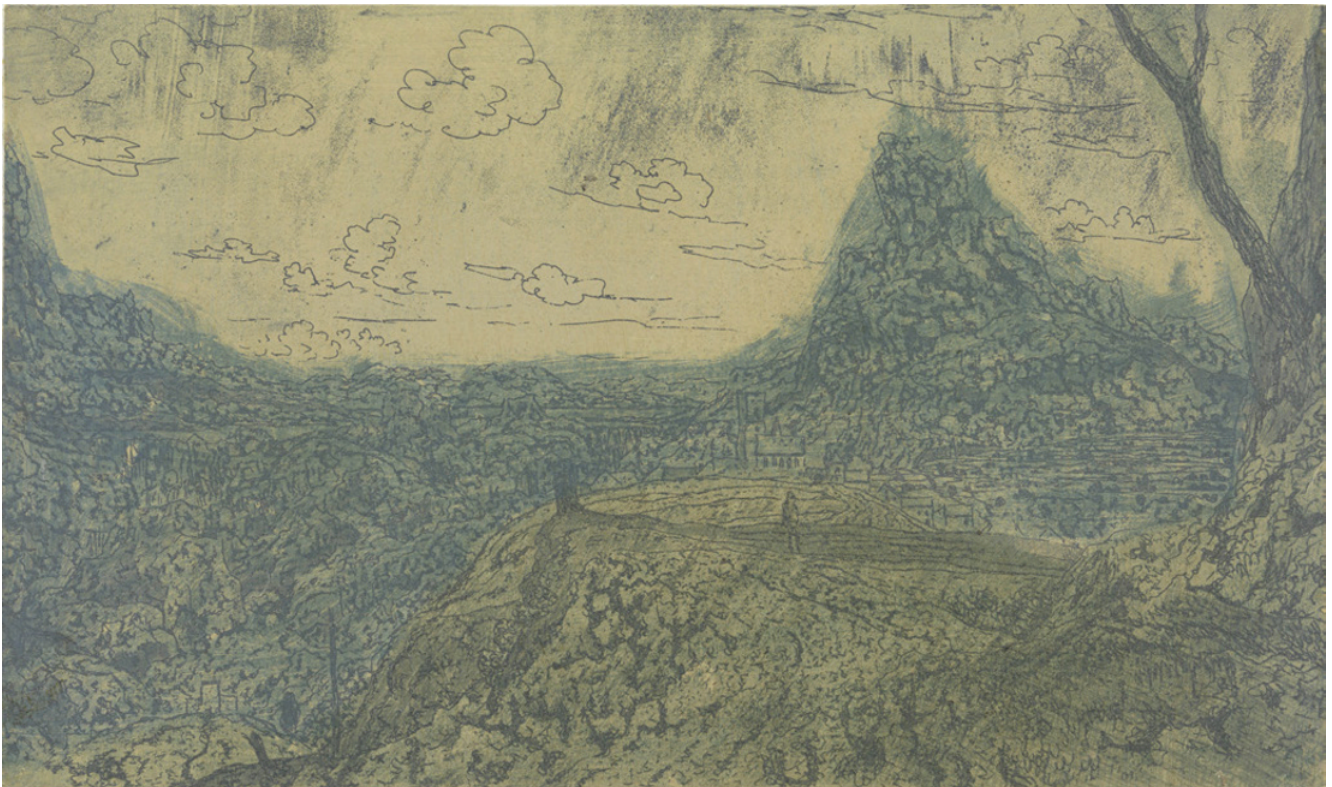


FIGURE. 17.4 *Hercules Segers, Landscape with Pointed Rock and Forked Tree (HB 15^{IIb}), c.1615–30, etching and drypoint printed in bluish-black ink on paper prepared with yellowish-pink colour, overpainted with olive-green and blue-green, 11.2 × 19.0 cm*
AMSTERDAM, RIJKSMUSEUM, RP-P-H-OB-815

without maintaining a one-to-one scale, such as the large and small *Ruins of the Abbey of Rijnsburg* (HB 46 and 47, respectively), and Segers often repeated individual motifs in his paintings and prints.

A reason for some of the compositional duplication might be found in HB 15 and 16. The former is printed in the normal manner with dark ink on a lighter support and the latter is a negative print. They are so close in size and composition that Segers may have conceived of them as two plates to be printed in register as a single print, one carrying the highlights and the other dark lines as with HB 25 ^{1b} (see composite image, Fig. 17.5). He may have worked them into separate images because the highlight plate did not align well with the 'key' plate. Such misalignment could have been the result of transferring the key image to the ground of another plate by way of offset from a freshly pulled impression, as damp paper stretches when sent through a press.²⁹ HB 20 is similarly a duplicate in negative of HB 19, and it may have served the same purpose. Although this theory is highly speculative, it seems significant that two of

the four instances of Segers transferring a composition from one plate to another are white-line prints.

Possible Motivations

Segers's idiosyncratic printed work has long puzzled artists and art historians. Beginning with Van Hoogstraten's biography, there has been wild speculation. Van Hoogstraten's claim that 'printers took his prints by the basket to the merchants of butter and soap for them to wrap their wares' is no doubt a biographical fabrication.³⁰ He elaborates that a destitute Segers – having printed on all of his family's linens and clothing – became depressed and drunkenly fell down the stairs to his death. A good story, but hyperbole at best. Segers likely did not print basketfuls of his prints; had he done so, he presumably would have attempted to market them more effectively. As for his untimely death via staircase, there is no documentary evidence and the story resembles other biographical topoi.

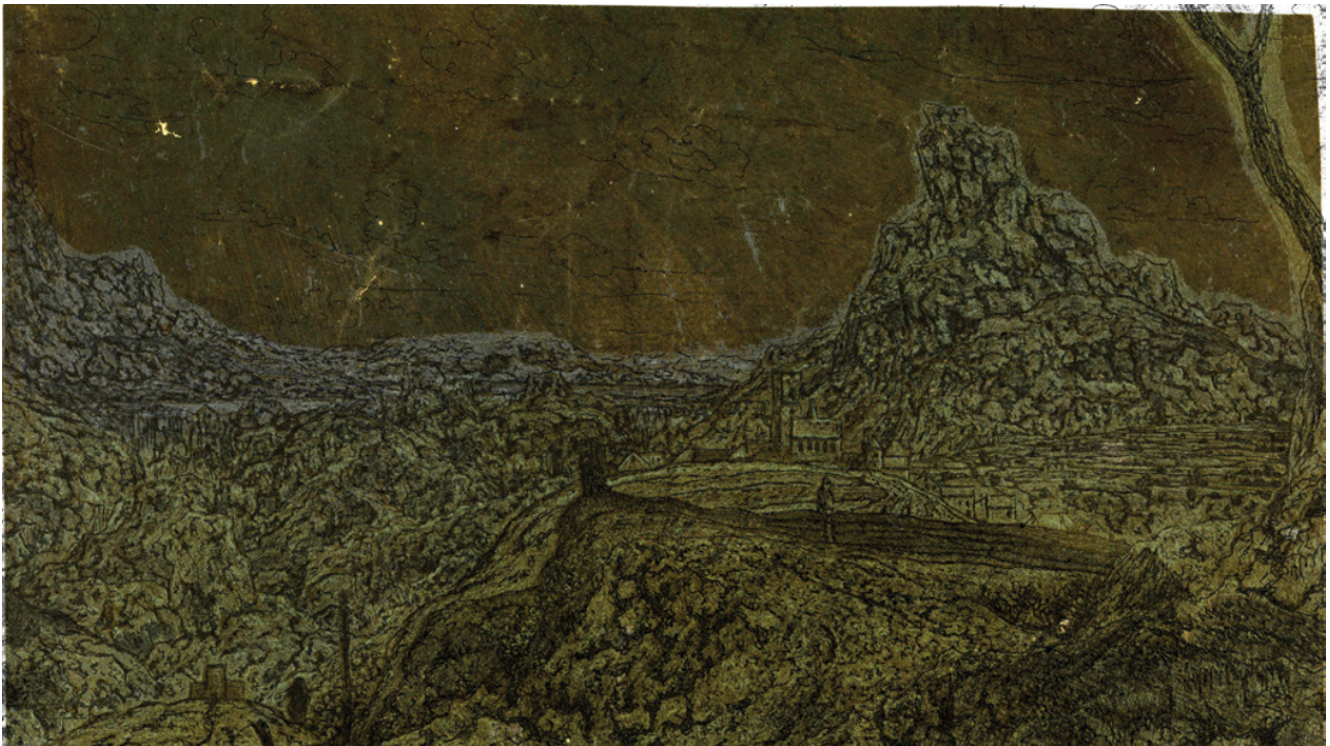


FIGURE. 17.5 Composite image of Figs. 17.3 and 17.4. For both, the contrast and brightness have been increased. The colour was removed from HB 15 ^{1b} so as to make it appear more like the line etching on the plate. HB 15 ^{1b} has also been elongated slightly to line up with HB 16.

(Berlin: Cassirer, 1910–12), 9, cat. no. 13b; Haverkamp Begemann, *Hercules Segers*, 74, 77.

29 Stijnman, *Engraving and Etching*, 159. HB 20 and 16 are marginally longer than their black-line counterparts and were therefore the later plates.

30 Haverkamp Begemann, *Hercules Segers*, 24; Van Hoogstraten, *Hooge Schoole*, 312: 'de Plaetdruckers brochten zijn printen met manden vol by de Vettewariers, om boter en zeep in te doen'.

For better or worse, Van Hoogstraten's account has greatly influenced scholarship on Segers, and 'psychobiographical' interpretations are often applied to his work.³¹ When asking why Segers made colour prints, one might suppose that his impulse to print in colour manifested inner feelings, but such a reading is unfounded. Suffice it to say that Segers's prints beg to be interpreted, and his ostensibly sombre palette of greys, blues and greens applied (sometimes haphazardly) in atmospheric washes tends to invite a certain kind of interpretation.³² In practical terms, Segers may have incorporated colour into his prints precisely because he wanted to make 'printed paintings', that is to say, unique colour images that could be produced more quickly and cheaply than paintings but sell for more than standard prints. However, the limited surviving impressions suggest that he never printed them on a lucrative scale, and his time-consuming, labour-intensive methods with limited yields suggest that commercial viability was unlikely. The idiosyncratic nature of the prints seems to eliminate financial gain as his main incentive.

Perhaps Segers's primary motivation was experimentation itself. Just as he invented the lift-ground process, he innovated in colour printing, multi-plate printing and hand-colouring. He may have had some particular ends in mind, or he may have made prints simply for his own enjoyment. There is certainly evidence that he was not always concerned with making polished, marketable or 'finished' products. Stray marks in the sky and design choices that compromise legibility led some art historians to question his sanity,³³ but they equally show an artist unconcerned with marketability. Many impressions have stains and off-sets of other prints, and none include a signature or publisher's address. If Segers's interest in printmaking was largely recreational, the experimentation with colours, multi-plate printing and tonal techniques are then consistent with his messy workshop practice, his small print runs and the apparent lack of distribution of his prints.

Segers's Legacy

Segers's printed work made no discernable impact on his contemporaries. No other printmaker working in his immediate circle did anything like him with regards to tonal techniques, colour printing or painting and individualising prints. This also supports a theory of isolated experimentation. After Segers's death in the 1630s, however, artists took notice. Etchings by Johannes Ruischer after c.1649 owe much to Segers, thus his appellation of '*jonge Hercules*' (young Hercules). Ruischer printed monochrome colour etchings, used coloured paper and painted colour or varnish on some impressions.³⁴ The most important of Segers's followers was Rembrandt van Rijn, who owned at least eight of his paintings and likely had a number of his prints.³⁵ He acquired the printing plate for *Tobias and the Angel* (HB 1) and, with scraper and dry-point, turned it into a *Flight into Egypt* (B. 56, c.1653). As the only instance of Rembrandt reworking another artist's plate, it indicates his appreciation for Segers's work. His affinity was passed from teacher to pupil for three generations, through Van Hoogstraten to Arnold Houbraken and to his son Jacob Houbraken. Since then, many collectors and artists have been inspired by his work, amongst them German filmmaker Werner Herzog and British modernist printmaker Stanley William Hayter, who counted him alongside Rembrandt, Jacques Callot, Giovanni Battista Piranesi and William Blake as a forerunner of modern printmaking.³⁶ Van Hoogstraten's biography concludes with an appropriate description of Segers's legacy: 'with his death [Segers opened] the eyes of all art lovers, who from that time on held his works in the high esteem they deserve, and always will deserve.'³⁷

³¹ See note 33 below.

³² None of Segers's plates were printed in red, orange or bright yellow, unlike the vibrant colour inks in prints by Johannes Teyler; see S. Turner, '*Opus typo-chromaticum*', this volume, 196–206.

³³ '[T]his man tormented by obsessions, who was driven by his demons to inscrutable complexity, self-tormenting practices sending him deeper and deeper into a hellish fantasy world of death, damnation, and loneliness'. Author's translation. G. Knüttel, *Hercules Seghers* (Amsterdam: Becht, 1940), 59.

³⁴ E. Trautscholdt, *Johannes Ruischer alias Jonge Hercules: Die Radierungen*, 'Supplement' in Haverkamp Begemann, *Hercules Segers*, 113–28.

³⁵ Rembrandt owned more paintings by Segers than by any other artist besides himself and Jan Lievens, who was Rembrandt's friend and fellow pupil under Pieter Lastman. W. Strauss and M. van der Meulen, *The Rembrandt Documents* (New York: Abaris Books, 1979), 348–87.

³⁶ S.W. Hayter, *New Ways of Gravure* (London: Routledge & Kegan Paul, 1949), 202–04.

³⁷ Van Hoogstraten, *Hooge Schoole*, 312.

Opus typo-chromaticum: The Colour Prints of Johannes Teyler

Simon Turner*

Thomas Herbert, 8th Earl of Pembroke (1656/7–1733), wrote captions beneath the prints in an album in his collection demonstrating the ‘first inventors of all the different manners.’ Below a print issued by Johannes Teyler (1648–c.1709) he noted: ‘Mr Tayler a Painter, who improved the printing of Stuffs in Holland!’¹ In 1821, Adam von Bartsch stated that ‘Taylor’ was ‘an English engineer under Friedrich Wilhelm I, the Great Elector’.² Neither seemed to know his Christian name or the spelling of the surname (often ‘Teiler’). Nevertheless both accurately identified aspects of Teyler’s unusual *curriculum vitae* and recognised his innovation in colour printing before the elaborate multi-plate printing process developed by Jacob Christoff Le Blon.³

The printmakers active in Teyler’s workshop used conventional intaglio techniques, but Teyler refined an unconventional method, printing coloured inks simultaneously to create polychrome images.⁴ Some prints feature non-linear, tonal stipple and mezzotint elements, as later found

in French eighteenth-century colour printmaking.⁵ In only ten years, 1688–97, he created over 600 colour prints (a conservative estimate) that achieved far brighter colours and more naturalistic effects than chiaroscuro woodcuts by exploiting the vibrancy of pigments and whiteness of paper.⁶ Their subjects are diverse – birds, butterflies, flowers, vases, portraits, town views – but their printing is consistently professional and tidy, with laboriously hand-crafted inking, pointing to a large-scale enterprise.

They are not experimental, original artistic statements in the manner of Hercules Segers,⁷ but there is an intriguing similarity: Segers ‘painted or printed on his shirts and on the sheets of his bed’ and Teyler printed on textiles.⁸ His willingness to go beyond printmaking on paper into, for instance, decorative and applied arts including tapestries and wallpaper, has been little explored.⁹ Teyler may have attempted other potentially lucrative endeavours, like illustrating books on natural history considering the many prints of birds, plants and animals, but none seem to have been commercially viable. However, his process was adopted in 1695 by the Amsterdam publishers Gerard Valck, who used it less daringly and less skilfully, and then Petrus Schenck and Carel Allard, who issued similar series of topographical prints in both black and coloured versions.¹⁰

* I thank Daniel DeSimone, Aagje Gosliga, Richard Hartmanni, Henrike Hövelmann, Suzanne Karr Schmidt, Eloy Koldewij, Karin Leonhard, Edwin van Meerkerk, Bianca du Mortier, Monique Peters, Marrigje Rikken, Pieter Roelofs and Guido de Werd. I particularly want to acknowledge Ad Stijnman, who is now compiling the oeuvre of Teyler for the NH-DF series.

1 Appendix to S. Palmer, *General History of Printing* (London: The Author, 1732), 392, no. 18. On the print collection, formed between 1683 and 1733, see A. Griffiths, ‘Print Collecting in Rome, Paris, and London in the Early Eighteenth Century’, *Harvard University Art Museum Bulletin* 2.3 (Spring 1994), 50–52.

2 A. von Bartsch, *Anleitung zur Kupferstichkunde*, 2 vols. (Vienna: Wallishauser, 1821), 1: 25. I thank Antony Griffiths for pointing me to this reference. Friedrich Boguslaff Neubauer wrote to Leibniz on 3 (=13) May 1694 that Teyler’s father, Willem (presumably William), was English; *Gottfried Wilhelm Leibniz: Sämtliche Schriften und Briefe*, various eds, vol. I,1 – ... (Berlin: Akademie-Verlag, 1923–...) [hereafter *Leibniz*], III.6 (2004): 76–77, no. 28; see also <http://www.leibniz-edition.de/Baende/ReiheIII.htm> (select III, 6) (accessed 15 November 2013).

3 On the spelling of Le Blon’s given names, see the Foreword, x, nt. 8.

4 For the state of knowledge concerning Teyler and his cohorts, see A. Stijnman, *Engraving and Etching 1400–2000: A History of the Development of of Manual Intaglio Printmaking Processes* (London: Archetype, 2012), 347–49.

5 V.I. Carlson and J.W. Ittmann, *Regency to Empire: French Printmaking 1715–1814*, exh. cat. (Baltimore: Baltimore Museum of Art; Minneapolis: Minneapolis Institute of Arts, 1984); M.M. Grasselli, *Colorful Impressions: The Printmaking Revolution in Eighteenth-Century France*, exh. cat. (Washington: National Gallery of Art, Lund Humphries, 2003).

6 C. Schuckman, ‘Teyler, Johannes’, in J. Turner ed., *The Dictionary of Art*, 34 vols. (London: Macmillan, 1996) 30: 568.

7 A Segers exhibition is scheduled at the Rijksmuseum in Amsterdam for the end of 2016, after which it will move to the Metropolitan Museum of Art in New York in 2017.

8 S. van Hoogstraten, *Inleyding tot de Hooge Schoole der Schilderkonst* (Rotterdam: F. van Hoogstraeten, 1678), 312.

9 Christiaan Huygens, in a letter to Leibniz of 29 May 1694, described seeing Teyler busy with his textile printing business; *Leibniz*, III.6 (2004): 105, no. 39.

10 M. Rikken, ‘Vroege kleurendruk in Amsterdam: een onbekend zeventiende-eeuws plaatwerk van Carel Allard’, *De boekenwereld* 24.4 (2007–08), 202–26; see E. Kolfin and M. Rikken, ‘Colourful topography’, this volume, 207–215.

They are technical *tours de force* of inking, wiping and printing. The process is laborious, slow and complex, not 'solid, sure and easy' as Le Blon wrote.¹¹ The colours are rubbed on to large expanses of the plate or carefully daubed on smaller areas using stumps of tightly rolled linen, associated with the French term *à la poupée*. After each application of a colour the plate is carefully wiped so that the lines receive the ink and the plate's surface is clean. Overly vigorous wiping makes the colour pale (due to insufficient ink) or removes it entirely. Keeping the colours separate is difficult; they bleed together and overlap, which can be observed under magnification. Applying the colour in whirling bands created a marbled effect, seen particularly on the prints of antique vases.¹²

Many of the prints combine colour printing with hand-colouring. Transparent watercolour increased the naturalistic effect, and sometimes opaque colour picked out minute details and increased the definition of small figures. In the topographical or *vedute* prints the sky is often unworked but extensively hand-coloured. The hand-colouring is usually fine, and Teyler probably employed a small team. However, there is no application of gold, a sure sign of special and expensive work, and it cannot be compared to the finest work of the period by the *meester afzetters* (master colourists) Dirck Jansz van Santen and Frans Koerten, who specialised in colouring topographical views and maps.¹³

Lacking a comprehensive catalogue, although this will shortly be remedied, Teyler's output is obscure.¹⁴ An

exhibition in Nijmegen and Cleves in 1961 was accompanied by a small but comprehensive publication.¹⁵ Examples of his work have been treated in various works, notably Clifford Ackley's *Printmaking in the Age of Rembrandt* (1981), Florian Rodari's *Anatomie de la couleur* (1996) and Jan van der Waals' alternative vision of 'Printmaking in the Golden Age from Art to Shelf Paper,' an exhibition in Rotterdam in 2006.¹⁶ They hinted at his significance but could not convey his prints' kaleidoscopic colour, pictorial variety and ambition.

Teyler did not aim for uniformly printed editions, and each rare impression of the same plate is slightly different. However, they are generally uniformly executed. Clifford Ackley characterised a typical plate as a 'mechanical criss-cross of dry, impersonal etched lines' and 'uninspired', although 'the overall feeling of space and of...light...is surprisingly effective'.¹⁷ Although nearly all his prints are unlettered, so they are untitled and the printmaker, artist and publisher are unnamed, several printmakers can be deduced. Surprisingly, there does not seem to have been a guide for the application of colour. The colouring of the larger plates are especially variable; the colour of the plumage of the Standing Cockerel (Fig. 18.1), likely a special Brabanter breed, close to the work of Melchior d'Hondecoeter, is always different.¹⁸ This uniqueness goes against the grain of the celebrated exact repeatability of printmaking.

11 Description of his method of printing pictures, with list of pictures so printed, London, British Library, Add. Ms. 4299 fol. 72–76, reference is to fol. 75^{r-v}.

12 Two are identifiable and famous, the Borghese Vase (Louvre, Paris) and the Medici Vase (Uffizi, Florence); F. Haskell and N. Penny, *Taste and the Antique: The Lure of Classical Sculpture 1500–1900* (New Haven and London: Yale University Press, 1981), nos. 81–82.

13 H. de la Fontaine Verwey, 'The Glory of the Blaeu Atlas and the "Master Colourist"', *Quaerendo* 11 (1981), 197–229; E. de Groot, *The World of a Seventeenth-Century Collector: The Atlas Blaeu–Van der Hem* (Houten: Hes & De Graaf, 2006); T. Goedings, 'Dirk Jansz. Van Santen and the colouring of the Atlas of Laurens van der Hem', *The Atlas Blaeu–Van der Hem: History of the Atlas and the Making of the Facsimile* (Houten: Hes & De Graaf, 2011), 101–54. See also T. Goedings, 'Een specialist onder vele vakgenoten. David Reerigh en zijn "superfijn" afgezette wandkaarten van Holland (1647) en Rijnland (1687/88)', *Caert Tresoor. Tijdschrift voor de Geschiedenis van de Kartografie*, 3 (2013), 85–96; J. Tervoort, "'Kaert- en konstafsetters'" van Amsterdam 1600–1710. Kleuren in de marge van 'culturele industrie?', Amsterdam 2013, accessed 15 November 2013, http://www.amsterjan.nl/db/WAS52c7f108f3fff/masterscriptie_definitief_aangepast_08_12_2013.pdf.

14 A. Stijnman, *Johannes Teyler*, S. Turner ed. NH-DF (Ouderkerk aan den IJssel: Sound & Vision, 2016; forthcoming).

15 G.T.M. Lemmens and J.A. van Beers, *Johannes Teyler: Nederlandse kleurendruk rond 1700*, exh. cat. (Nijmegen: Stichting Nijmeegs Museum voor Beeldende Kunsten, 1961) + *Ergänzung des Kataloges für die Ausstellung im städtischen Museum Haus Koekkoek* (stencil).

16 C. Ackley, *Printmaking in the Age of Rembrandt*, exh. cat. (Boston: The Meriden Gravure Company, 1981), no. 212; F. Rodari and M. Préaud, eds., *Anatomie de la couleur: L'Invention de l'estampe en couleurs*, exh. cat. (Paris and Lausanne: Snoeck-Ducaju, 1996), nos. 20–22; J. van der Waals, *Prenten in de Gouden Eeuw: van kunst tot kastpapier*, exh. cat. (Zwolle: Waanders, 2006), nos. 27, 179, 230. Most recently Teyler was included in M. Grimm, C. Kleine-Tebbe and A. Stijnman, *Lichtspiel und Farbenpracht: Entwicklungen des Farbdrucks 1500–1800*, exh. cat. (Wolfenbüttel: Harrassowitz, 2011), no. 31 and E. Kolfin and J. van der Veen, eds., *Gedrukt tot Amsterdam: Amsterdamse prentmakers en -uitgevers in de Gouden eeuw*, exh. cat. (Zwolle: Waanders; Amsterdam: Museum Het Rembrandthuis, 2011), 32–33, figs. 20–21.

17 Ackley, *Printmaking*, 304.

18 Close to a painting in Dublin, National Gallery of Ireland, NGI.509. See I. de Groot, *Vogels: prenten, tekeningen en foto's in de verzamelingen van het Rijksmuseum en de Bibliotheek van het Rijksmuseum* (Amsterdam: Rijksmuseum, 1999), 37.



FIGURE. 18.1 *Anonymous, after Melchior d'Hondecoeter, Cockerel Standing on One Leg, c.1688–97, engraving, à la poupée inking, with hand-colouring of the background, 67.3 × 51.8 cm*
 LONDON, BRITISH MUSEUM, 1871,1209.5139; © TRUSTEES OF THE BRITISH MUSEUM

Teyler's Life

Much is known about Teyler's life, but not how he arrived at colour printing. He was born in Nijmegen in 1648 and studied at the *Kwartierlijke Academie*, completing a philosophical thesis in 1668. He was briefly at Leyden University and in 1670 became a professor of philosophy and mathematics in Nijmegen.¹⁹ The military assaults at the start of the Franco-Dutch War in 1672 (the 'disaster year') and the French invasion of Holland halted his academic career, and he moved to Berlin and reinvented himself as a capable military engineer for Friedrich Wilhelm I, Elector of Brandenburg.

Brandenburg-Prussia recovered quickly at the end of the Thirty Years War in 1648 and became increasingly politically organised and militarily powerful.²⁰ Numerous Dutch artists, craftsmen, architects and others came to Berlin and were embraced for their skills.²¹ The Calvinist Friedrich Wilhelm I had been educated in the Dutch Republic 1634–1638 and studied at Leyden University. His ties with Holland were strengthened with his marriage to Louise Henriette, Princess of Orange, in 1646. Teyler was evidently employed for his practical mathematical abilities as a military engineer in the campaigns against the Swedes in Pomerania, including the siege of Stettin in 1677. In 1678 Teyler was given a teaching appointment at the Brandenburg court, but he left in 1679 to study Mediterranean fortifications, visiting Sicily, Egypt and the Holy Land.²² Twenty drawings survive in the Rijksmuseum related to this journey.²³ He also stayed in Rome and joined the clique of Dutch and Flemish artists called the *Bentvueghels* in Rome (c.1679–82), receiving the alias '*Speculatie*' (Enterprise). He returned in 1683.

In 1688 Teyler was granted a privilege by The States of Holland and West Frisia 'to print on paper, silk, cotton and other materials' using his 'new method'.²⁴ Guarding it was clearly a concern and to deter copyists, an advertisement in the *Amsterdamsche Courant*, 7 December 1690, reminded the public of his privilege and his former capacity as *Krygsraed* (military expert to the Elector of Brandenburg).

He opened a wall-hanging factory, but even when it was in operation he aspired to an academic career. He failed to become Professor of Mathematics in Utrecht, and he corresponded with Gottfried Wilhelm Leibniz in 1694 about a post of Professor of Mathematics at the *Ritterakademie* of Duke Anton Ulrich von Braunschweig-Wolfenbüttel.²⁵ Some evidence of his 'factory' and its products is provided by the scientist Christiaan Huygens, who described a '*Manufacture de toiles imprimées*' (factory for printed fabrics) and boutique.²⁶ It was not a typical printshop but a large and beautiful house called *te Blotinge* in the countryside in Rijswijk (near The Hague). A letter from Johann Daniel Krafft in 1695 mentioned Teyler's considerable investment but compared his work negatively to that of Maria Sybilla Merian.²⁷

Arnold Houbraken recounted Teyler's fruitless mission to Berlin in 1697: he and the artist Jacob de Heusch hoped that Minister Eberhard von Danckelmann, who was involved in the foundation of the *Academie der Künste* (1696), could introduce them to the service of the court of Friedrich III, later Friedrich I, King of Prussia.²⁸ Von Danckelmann had recently fallen from his position and could not help, which was a considerable blow to Teyler.

19 For his academic incarnation see J.M.G.M. Brinkhoff, 'Verheerlijkt Nijmeegs vernuft: lofzangen op Teiler', *Jaarboek Numaga* 30 (1983), 99–102 and E. van Meerkerk, 'The Right Use of Reason: The Only Philosophical Thesis at the Former University of Nijmegen (1668)', *Lias* 26 (1999), 77–102. For his residence in Rijswijk see A.D.A. Monna, 'Opnieuw Johannes Teyler', *Jaarboek Numaga* 32 (1985), 11–13. See also the biographies by W.J. P[antus], 'Johannes Teyler', *Jaarboek Numaga* 51 (2004), 124; E. van Meerkerk, http://www.biografisch woordenboekgelderland.nl/bio/4_Johannes_Teiler (accessed 15 November 2013).

20 C. Clark, *Iron Kingdom: The Rise and Downfall of Prussia 1600–1947* (London: Penguin Books, 2006), 38–66.

21 H. Börsch-Supan, *Die Kunst in Brandenburg–Preußen* (Berlin: Gebr. Mann Verlag, 1980).

22 Teyler sent a report of his travels to Kurfürst Friedrich Wilhelm I von Brandenburg (Geheimes Staatsarchiv Preussischer Kulturbesitz, I. HA Geheimer Rat, Rep. 9 Allgemeine Verwaltung K Lit d Fasz. 3, 25–35), who replied 14 June 1683 (*Ibid.*, 36).

23 RP-T-1935-59...78.

24 Granted for 25 years on 20 February 1688. A. Bredius, 'Uit de "Minute Octrooien der Staten van Holland en West-Friesland"', F.D.O. Obreen, *Archief voor Nederlandsche Kunstgeschiedenis*, 7 vols. (Rotterdam: Van Hengel & Eeltjes, 1888–90), 7: 136–65, esp. 154–55; Lemmens and Van Beers, *Johannes Teyler*, 12; I. van Eeghen, 'Petrus Schenck en zijn "Afbeeldinge der voornaamste gebouwen van Amsterdam"', *Jaarboek van het Genootschap Amstelodamum* 66 (1974), 122. Van Eeghen corrected and completed Bredius' transcription.

25 R. Grieser, 'Korrespondenten von G.W. Leibniz. I. Johannes Teyler. Geb. (get. 23.) Mai 1648 – gef. zwischen 1701 und Juni 1709', *Studia Leibnitiana*, vol. I – ... (Wiesbaden, Stuttgart: Franz Steiner Verlag, 1969 – ...) I (1969): 208–27; *Leibniz*, 81–82, no. 32 (7 (=17) May 1694).

26 *Leibniz*, 105, no. 38 (29 May 1694) and 108, no. 40 (8 June 1694).

27 *Leibniz*, 266, no. 88 (late December 1694, early January 1695).

28 De groote schouburgh der Nederlantsche konstschilders en schilderessen, 3 vols. (Amsterdam: 1718–21) 3: 364–65; H.J. Horn, *The Golden Age Revisited: Arnold Houbraken's Great Theatre of Netherlandish Painters and Paintresses*, 2 vols. (Doornspijk: Davaco, 2000) 1: 248.

Teyler's Output

Three special albums of Teyler's prints survive in London, Washington, DC, and Amsterdam. A fourth, recorded in Berlin, is lost.²⁹ The London and Amsterdam albums have similarly gilt-tooled leather covers, probably by an Amsterdam bookbinder c.1710–1740.³⁰

The largest album, in the British Museum, London,³¹ was a highlight of a Frederik Muller sale on 18–20 April 1868.³² It comprises 184 prints with a spectacular ornamental title page (*Opus typo-chromaticum*; Fig. 18.2),³³ a frontispiece,³⁴ and a further calligraphy title in Dutch that suggests a theoretical work.³⁵ However, no textual description of the process or treatise like Le Blon's *Coloritto* of 1725 is known. The mostly iconographic arrangement of the prints showcases the techniques' different uses: artistic, illustrative, decorative and scientific. In addition to detailed botanical plates and a human skeleton, there are decorative images of flowers for which colour printing is most appropriate. It also contains large-format plates of birds and animals, including a flying duck, parrot, camel, elephant, lizard and snake. The elephant derives from an etching by Herman Saftleven,³⁶

and the lizard and the snake snapping at a butterfly echo the work of the Nijmegen-born artist Otto Marseus van Schrieck.

The Washington album, entitled *Verscheide soorte van Miniatuur* (Several types of miniature), is dated 1693 (no others can be so concretely dated) and comprises 51 prints, lacking the larger plates.³⁷ It was in the collection of Howard C. Levis in 1919 and then acquired by the bibliophile Lessing J. Rosenwald before coming to the Library of Congress in 1979.³⁸

The Amsterdam album comprises 135 prints on 80 folios, a plate per page with other prints cut out and inserted.³⁹ Peter Fuhling described the album, focusing on ornament prints copied from Jean Lepautre, Jean-Baptiste Monnoyer and Charles Errard.⁴⁰ It contains prints not found in the London album, including grapes, a quince and two apples, daffodils, carnations, a poppy, a tulip, several flower wreaths and large flower arrangements (Fig. 18.3). The larger format allowed for more arresting designs and better visibility for wall decorations.

Amsterdam has a good collection of loose impressions that may have also derived from albums. A number of other collections (e.g., in Braunschweig, the V&A in London, Nijmegen, Paris, Wolfenbüttel) also have examples of Teyler prints. The Kupferstich-Kabinett, Dresden, has a substantial group in a modern-bound album called *Receuil d'estampes gravées et imprimées en couleur à l'imitation de la peinture* (Collection of prints engraved and printed in colour in imitation of painting), together with the largely mezzotint oeuvre of Petrus Schenck.⁴¹ Teyler prints also appear on the art market regularly.⁴²

JAN VAN CALL

Although barely acknowledged, the draughtsman Jan van Call was the presiding artistic genius for Teyler's topograph-

29 Its contents can partially be reconstructed from Haemmerle, *Der Farbstich*, 47–51.

30 J. Storm van Leeuwen, *Dutch Decorated Bookbinding in the Eighteenth Century*, 3 vols. (Houten: Hes & De Graaf, 2006) 1: tools nos. 32 and 33 on p. 270, tool no. 146 on p. 273, tool no. 26 on p. 344. 1871,1209,5003–5187; shelfmark 191*.b.1.

31 F. Muller, *Catalogue d'une grande et très-belle collection de livres et estampes*, sales cat. (Amsterdam: Muller, 1868), 68–69, lot 1085; it was described on the front cover as 'Collection unique de 173 planches en chromotypie avant 1700' (unique collection of 173 plates in colour printing before 1700).

32 *Joh: Teileri / Batavi / Chalcographi ingeniosissimi / Opus / typo-chromaticum, / id est: / Typi Aenei omni colorum genere / simul impressi, et ab ipso / primum inventi* (Colour Print Work of the most ingenious Dutch engraver Johannes Teyler, i.e., all copper plates printed with all kinds of colour, and invented by himself).

34 Inscribed in pen and ink 'Quam / nec Parrhasius palmam / carp-sit / nec Apelles / TEYLERUS / punctis / atque colore / tulit' (Neither Parrhasius nor Apelles picked this palm branch; Teyler rendered it with points and colour).

35 'Consideratien over de Schilderkonst Ende de Voornaemste deelen vande Geometrie, Architecture ende Perspective / Die daeromtrent moeten in acht genoomen worden om deselve Konst door / Demonstrative Redenen tot een aengenaeme gemakkelicke en vaste Practick te brengen' (Reflections about the Art of Painting; and the most prominent aspects of Geometry, Architecture and Perspective which should be observed about these in order to render that same art (i.e. Painting) into a pleasant, easy and set practice through demonstrative ways).

36 H-DF 23: no. 40.

37 Rosenwald 1448. See *The Lessing J. Rosenwald Collection: A Catalog of the Gifts of Lessing J. Rosenwald to the Library of Congress, 1943 to 1975* (Washington: Library of Congress, 1977).

38 <http://www.loc.gov/rr/rarebook/rosenwald-16cen18cen.html> (accessed 15 November 2013).

39 RP-P-1955-165...299, from the collection of F.G. Waller; shelfmark 313-B-1; M.D. Henkel, 'Teyler, Johan' in *Allgemeines Lexikon der Bildenden Künstler*, U. Thieme and F. Becker eds, 37 vols. (Leipzig: Seemann, 1938) 32: 573–74 lists 142 further prints in the Rijksprentenkabinet.

40 P. Fuhling, *Ornament Prints in the Rijksmuseum, ii. The Seventeenth Century*, 3 vols. (Ouderkerk aan den IJssel: Sound & Vision Publishers BV, 2004) 3: 376, Alba. 13.

41 A 1159 b,3.

42 C.G. Boerner, *Farbige Graphik = Colour Prints*, sales cat. (Düsseldorf and New York: 1999), nos. 11–62.



FIGURE. 18.2 *Anonymous, Opus typo-chromaticum, c.1688–97, engraving and etching inked à la poupée, 50.5 × 39.7 cm*
 LONDON, BRITISH MUSEUM, 1871,1209.5003; © TRUSTEES OF THE BRITISH MUSEUM



FIGURE. 18.3 *Anonymous, Bunch of grapes, c.1688–97, engraving inked à la poupée, 40.6 × 27.0 cm*
AMSTERDAM, RIJKSMUSEUM, RP-P-1955-269; © RIJKSMUSEUM

ical and architectural prints.⁴³ Many of his precise, linear and colourful drawings survive, including views of Amsterdam, Berlin, Cleves, The Hague, the Lower Rhine region and Rome. He also made drawings of his hometown Nijmegen, including a view of its bustling *Grote Markt*.⁴⁴ The Berlin Kupferstichkabinett preserves a watercolour of the Siege of Stettin of 1677, and prospects of Stralsund under siege in 1678 are in the Teylers Museum, Haarlem. His exotic views from the south of Italy, Egypt and the Near East may indicate that he accompanied Teyler on his journeys from 1679.⁴⁵

Typical examples of Van Call's work include a pair of plates reproducing his designs of historical Berlin and its principal palace, residence of the Brandenburg Electors.⁴⁶ They are rare, early visual evidence of the appearance of the structure of the Berliner Stadtschloss before Andreas Schlüter's alterations and embellishments (1698) and should be compared to contemporary drawings by Johann Stridbeck the Younger.⁴⁷ Less typical is a drawing in the British Museum (1702), a collaboration with the famous maritime artist Ludolf Bakhuizen.⁴⁸ The prospect of Amsterdam with the yachts of the Russian Tsar Peter the Great is over two metres long.

Many of Van Call's works are in a roundel format, like a view from a circular window or peephole. The exaggerated perspective and illusion of recession recall *vue d'optique* prints. Indeed, his works, as published by Schenck and others, of numerous palaces, grand houses and their gardens, are forerunners to the substantial eighteenth-century production of *demi-fine* topographical prints.⁴⁹

A bust portrait of him appears on the titlepage to the *Admirandorum quadruplex spectaculum* (c.1695–1697), a series of uniform city views.⁵⁰

FANS

A surprising aspect of Teyler's oeuvre are fans. The best known printed fan leaves are probably those by Abraham Bosse, Stefano della Bella, Jacques Callot and others such as Nicolas Loir working in Paris in the seventeenth century, but fan production and consumption was international.⁵¹ They were designed to be cut out and used, but were nevertheless high quality and certainly not ephemeral. Fans were associated with elegance and luxury, the refined French nobility and the court at Versailles. Dutch fans from the seventeenth century are rarer than those from the eighteenth.⁵² The London album includes two fan leaves printed on robust paper (Fig. 18.4) with elaborate arching compositions and artfully arranged figural scenes: Diana floating on a cloud above a classical landscape populated by nymphs and Cupid, Apollo strumming his harp with satyrs and a ring of six dancing putti in the sky. The twisting female figure with a vase at bottom left is derived from a famous engraving by Marcantonio Raimondi after Raphael's *Judgement of Paris*. The sources are otherwise difficult to identify, and the compositions may be original. But two fans, compared to thousands that could be produced cheaply and imported from China, suggest a limited output and profit.

FABRICS AND OTHER MEDIA

Printing on fabric remains to be surveyed,⁵³ but Teyler's work with alternative supports is not unprecedented; other printmakers used their skills in engraving for practical applications, such as sleeping caps,⁵⁴ and rare examples of prints on silk, satin and other textiles survive.

Two examples of Teyler's work on textile and furnishings are held in the Rijksmuseum: irregular scallop-shaped

43 J. van Gool, *De nieuwe schouburg der Nederlantsche kunstschilders en schilderessen*, 2 vols. (The Hague: 1750–51) 1: 117–21; W.J. P[antus], 'Jan van Call (i, ii, iii)', *Jaarboek Numaga* 51 (2004), 31; P. Roelofs, 'Bij de 350ste geboortedag van Jan van Call', *Jaarboek Numaga* 53 (2006), 145–54. See also P.C. Vis, 'Jan van Call, 1656–1706' (ma diss., University of Amsterdam, 2012).

44 Oxford, Ashmolean Museum, WA1863.240.

45 The Metropolitan Museum of Art, New York, recently acquired a *View of the Obelisk of Thutmose III Seen from the Walls of Alexandria* (2010.125).

46 G. Ernst and U. Laur-Ernst, *Die Stadt Berlin in der Druckgrafik 1570–1870*, 2 vols. (Berlin: Lukas, 2009) 1: 787–90.

47 W. Löschburg, *Die Stadt Berlin im Jahre 1690: Gezeichnet von Johann Stridbeck dem Jüngeren* (Stuttgart: W. Kohlhammer GmbH, 1981). The drawings are in the Staatsbibliothek Berlin (Ms. Boruss. quart. 9).

48 BM, 1847.0326.1–3; G. de Beer, *Ludolf Backhuysen (1630–1708): Sein Leben und Werk* (Zwolle: Waanders, 2002), 175–77; B. Bakker and E. Schmitz, *Het aanzien van Amsterdam: Panorama's, plattegronden en profielen uit de Gouden Eeuw*, exh. cat. (Amsterdam: Thoth, 2007), 255–57, no. 59 and pl. vi.

49 C.J. Kaldenbach, 'Perspective Views', *Print Quarterly* 2 (1985), 87–104.

50 H-DF 25, no. 599. The volume is dedicated to Friedrich, Duke of Saxony, and includes his mezzotint portrait (H-DF 25, no. 181).

51 For early examples of printed fans and a fan-shaped headdress by Agostino Carracci, see 'Applied Prints' by S. Karr Schmidt, *Altered and Adorned: Using Renaissance Prints in Daily Life*, exh. cat. (Chicago: Yale University Press, 2011), 51–54.

52 I. van Eeghen, 'De Amsterdamse waaierindustrie in de 18de eeuw', *Jaarboek Amstelodamum* 45 (1953), 152–82; I. Van Eeghen, 'Waaiers, dertig jaar archiefonderzoek en verzamelen', *Nederlandse kunstnijverheid en interieurkunst*, in *Nederlands Kunsthistorisch Jaarboek* 31 (1981), 364–74.

53 For a summary see Stijnman, *Engraving and Etching*, 265–66. Research is underway by Suzanne Karr Schmidt.

54 N. Orenstein, 'Who Took the King of Sweden to Bed?', *Print Quarterly* 8 (1991), 44–47.



FIGURE 18.4 *Anonymous, Fans, c.1688–97, engraving and etching inked à la poupée, 25.0 x 48.0 cm and 24.8 x 48.0 cm*
LONDON, BRITISH MUSEUM, 1871,1209.5070 AND 1871,1209.5071; © TRUSTEES OF THE BRITISH MUSEUM

fire screens, with one side printed on canvas and the other embroidered with coloured wool and stretched on a wooden mount.⁵⁵ They could be mounted on a wooden

stand, or held by hand, protecting the face from heat and saving pale, delicate skin from flushing. One features a putto carrying a basket of flowers on his head and the other a roaring lion (Fig. 18.5). The London album includes individual impressions of both prints (Fig. 18.6). Like other

55 BK-NM-3151 and BK-NM-3152; B. du Mortier, *Waaiers en Waaierbladen, 1650–1800 = Fans and Fan Leaves 1650–1800*, exh. cat. (Amsterdam: Rijksmuseum, 1992), no. 3; Van der Waals, *Prenten in de Gouden Eeuw*, no. 27; B. du Mortier and N. Bloemberg, *Accessorize! 250 Objects of Fashion & Desire*, exh.

cat. (Amsterdam: Rijksmuseum, 2009), 57 and 257. See <http://www.rijksmuseum.nl/formats/accessoires/index.jsp?lang=en> (accessed 15 November 2013).



FIGURE. 18.5 *Anonymous, Fire Hand Screen with a Lion, c.1688–97, engraving inked à la poupée, 26.0 cm × 20.0 cm*
AMSTERDAM, RIJKSMUSEUM, BK-NM-3152;
© RIJKSMUSEUM



FIGURE. 18.6 *Anonymous, Lion, c.1688–97, engraving inked à la poupée, 39.2 × 27.4 cm*
LONDON, BRITISH MUSEUM, 1871,1209.5172;
© TRUSTEES OF THE BRITISH MUSEUM

designs, the lion is also found in a smaller format, pointing to choices for clients and a wider potential variety of decorative uses.

One of Teyler's engravings printed on silk, a large *Rape of Proserpina* in the Yale University Art Gallery, New Haven, is an exceptional survival given the fragility of the support.⁵⁶ The print is possibly part of a series, being similar in size and format to two prints in Amsterdam (*Apollo in his Chariot* and *Phaeton*).⁵⁷

References to his other fabric printing are tantalising. According to Roeland van Eynden and Adriaan van der Willigen, who included Teyler in their lexicon of artists, 'Not only did he print his plates on paper, but also on white linen, which, stretched on frames, served as little paintings. The combination of several plates produces wall-coverings.'⁵⁸ Teyler himself indicated the range of printed fabric products in advertisements for a series of 'everything must go' sales in Rotterdam in the newspaper the *Amsterdamse Courant* in 1698.⁵⁹ Along with his presses and tools, they included all the 'cut copper art plates... printed wall hangings, pavillion and bed hangings, and a quantity of printed silk, cotton and dimity textiles.' Unfortunately no identifiable examples of these decorative but practical hangings, which were affordable alternatives to expensive tapestries, survive, though one was recorded.⁶⁰ We can only speculate why Teyler sold up and ended his enterprise, but he left a legacy of colour prints of an advanced technical quality, and his decorative motifs were used later in other media including porcelain and tiles.⁶¹

⁵⁶ YUAG, 2011.45.5.

⁵⁷ RMA, RP-P-1939-41 and 42.

⁵⁸ R. van Eynden and A. van der Willigen, *Geschiedenis der Vaderlandsche Schilderkunst, sedert de helft der xviii eeuw*, 4 vols. (Haarlem: A. Loosjes, 1816–1840) 1: 177. Quoted in Mortier, *Waaiers en Waaierbladen*, 12.

⁵⁹ G. Lemmens, 'Nieuwe gegevens betreffende de Nijmeegse hoogleraar Johannes Teyler, "uitvinder" van de kleurendruk', *Jaarboek Numaga* 30 (1983), 51–52; M.G.A. Schipper-van Lottum, *Advertenties en berichten in de Amsterdamse Courant uitgetrokken op kleding, stoffen, sieraden en accessoires tussen de jaren 1672–1765*, 5 vols. (Amsterdam, 1993–2001) 4: 301, no. 1572 and 310, no. 1628.

⁶⁰ Van Eynden and Van der Willigen, *Geschiedenis*, 1, esp. 178–79 describing a printed linen wall-covering in the house of burger-captain Bakker on the Korenmarkt in Nijmegen attributed by them to Teyler.

⁶¹ L. Wiesinger, 'Drei unbekannte Ansichten des kurfürstlichen Berliner Schlosses aus dem 17. Jahrhundert', in *Schlösser-Gärten-Berlin: Festschrift für Martin Sperlich zum 60. Geburtstag* 1979, D. Heikamp ed. (Tübingen: Ernst Wasmuth, 1980), 35–51, esp. figs. 7–8. According to Willem Joliet, the cock and parrot were used as sources for Delftware tile schemes; 'De haan en de

'Art of Great Use'

With Teyler intaglio colour printing came to full bloom for the first time in print history and yet his innovations were scarcely acknowledged largely due to the rarity of the prints. Beyond the few albums a few impressions of his prints came into the hands of connoisseurs. Samuel Molyneux, Fellow of the Royal Society and Secretary to the Prince of Wales, later King George II, recorded his explorations of collections of pre-museum London in 1712–13 stumbled upon an example.⁶² He was given access to the collections of Lord Pembroke (whose manuscript captions are mentioned in the introduction of this essay)

and was shown the first print album containing 'the different Masters & Inventions in Etching & graveing'. Describing Pollaiuolo as an exemplar of the 'first beginning', Molyneux singled out as most remarkable Claude Mellan's famous 'Head of Our Saviour...of ye natural bigness', engraved with a single spiralling line of varying thickness, and a print made 'in different colours' by Teyler, a vanguard work from the 'present time'. Unfortunately the print is not specified, nor in the catalogue of the Wilton House sale in 1917.⁶³ Molyneux was typically interested in rare and extraordinary curiosities, instinctively recognizing that printing in colours was modern and an 'Art of great use' in a Newtonian age and beyond.

papegaai op bloemvaastableaus', accessed 15 November 2013, http://www.tegels-uit-rotterdam.com/hahnundpapagei_niederl.

62 *The London Letters of Samuel Molyneux, 1712–13*, P. Holden introd. and commentary, A. Saunders ed., S. O'Connell epilogue (London: London Topographical Society, 2011), 49–50.

63 *Catalogue of the Superb Prints, Drawings, Pictures, and Armour from the Historical Collections at Wilton House, Salisbury*, Sotheby, Wilkinson & Hodge, sales cat. (London: July 5–6, 1917), lot. 299.

Colourful Topography: A Short-Lived Practice in Amsterdam Print Publishing around 1700

Elmer Kolfin and Marringje Rikken*

In the business of print publishing it was important to pair tradition to innovation.¹ By the end of the seventeenth century, there was a longstanding tradition of topographical prints, and the latest invention was intaglio colour printing *à la poupée*.² Johannes Teyler from Nijmegen was granted a privilege on it by the States of Holland and West Frisia on 20 February 1688,³ and much of his workshop's output has survived.⁴ From 1695 Teyler's technique was applied for the production of multi-colour topographical prints by Amsterdam publishers, namely Carel Allard, Cornelis Danckerts and the business partners and brothers-in-law Petrus Schenck and Gerard Valck.⁵

The topographical series by Schenck Valck and Allard were the most important colour publications to appear in seventeenth-century Amsterdam.⁶ Schenck and Valck obtained a privilege on their prints 'to be made in black or coloured' on 24 September 1695.⁷ This probably relates to two topographical series, of which some copies were printed in colour: Schenck's *Admirandorum Quadruplex Spectaculum* (1694–1697) and Valck's *Vues et Perspectives de Loo, Honselarsdyk et Soesdyk, Chateaux et Maisons de Plaisance du Roi de la Grande Bretagne, auxquelles on a ajouté les veuës des environs de Cleves* (dated 1695 on the title page).⁸ Allard produced his *Tooneel der voornaamste*

* We would like to thank Ann Jensen Adams, Hans Buijs, Roman Grigoryev, Nadine Orenstein, Femke Speelberg and Pieter Vis for their help.

1 See C. Rasterhoff, 'The Fabric of Creativity in the Dutch Republic: Painting and Publishing as Cultural Industries' (PhD diss., University of Utrecht, 2012), 75–101 (on book publishers) and E. Kolfin, 'Amsterdam, stad van prenten. Amsterdamse prentuitgevers in de 17de eeuw', in *Gedrukt tot Amsterdam. Amsterdamse prentmakers en – uitgevers in de Gouden Eeuw*, ed. E. Kolfin and J. van Veen (Zwolle: Waanders; Amsterdam: Museum Het Rembrandthuis, 2011), 30–33 (on print publishers).

2 The technique itself was older but remained very limited in scope and practice until Johannes Teyler professionalised it in the period 1688–98; A. Stijnman, *Engraving and Etching 1400–2000: A History of the Development of Manual Intaglio Printmaking Processes* (London: Archetype; Houten: Hes & De Graaf, 2012), 247–48.

3 A. Bredius, 'Uit de Minute Octrooien der Staten van Holland en West-Friesland' in Fr.D.O. Obreen, *Archief voor Nederlandsche kunstgeschiedenis*, 7 vols. (Rotterdam: Van Hengel & Eeltjes, 1877–90), 7: 154–55. G.Th. Lemmens en J.A. van Beers, *Johannes Teyler. Nederlandse kleurendruk* (Nijmegen: Stichting Nijmeegs Museum voor Beeldende Kunsten, 1961), 12. For a revised transcription of the text, see I.H. van Eeghen, 'Petrus Schenck en zijn "Afbeeldinge der voornaamste gebouwen van Amsterdam"', *Jaarboek van het Genootschap Amstelodamum*, 66 (1974): 117–36.

4 See S. Turner, 'Opus typo-chromaticum', this volume, 196–206. See the volumes on Johannes Teyler, compiled by Ad Stijnman, in *New Hollstein Dutch & Flemish* (Ouderkerk aan den IJssel: Sound & Vision, forthcoming 2015).

5 Petrus Schenck married Gerard Valck's sister Agatha in 1673; F.G. Waller, *Biographisch Woordenboek van Noord Nederlandsche graveurs* (The Hague: Nijhoff, 1938), 287. Another publisher who, from c. 1700, incidentally produced *à la poupée* inked prints was Pieter van den Bergh.

6 So far, only six artistic colour prints from this period are known. All were made in Amsterdam. Four were pulled from plates by Abraham Blooteling while two others were by Jan van Call. In 1689 Blooteling bequeathed his plates to his sister Maria who was married to Gerard Valck; A.D. de Vries, 'Biografische aantekeningen betreffende voornamelijk Amsterdamsche schilders, plaatsnijders, enz. en hunne verwanten', *Oud Holland* 3 (1885), 67; Kleerkoper and Van Stockum, *De boekhandel te Amsterdam*, 60. The prints are after Anthony van Dyck, *Ecce Homo* (H-DF, 6: 110, no. 76); after Jan van Neck, *Alpheus and Arethusa* (H-DF 14: 136, no. 80); after Jan van Neck, *Diana and her Nymphs* (H-DF 14: 136, no. 82); after Gerard de Lairese *Hercules and Omphale* (H-DF 10: 19, no. 83). To this we can add Blooteling's topographical engraving after Abraham Bega of Honselaarsdijk Palace, originally from 1684 (H-DF 1: 216, no. 117). The prints by Van Call are six scenes from Virgil's *Bucolica* published by Petrus Schenck (Amsterdam, Rijksmuseum, RP-P-1936-24, RP-P-1936-26). Cornelis de Bruijn had the illustrations for a copy of his *Reisen door de vermaardtse deelen van Klein Asia* (Delft: Krooneveld, 1698) and for a copy of its French translation (1700) printed in colours; Z.C. von Uffenbach, *Merkwürdige Reisen durch Niedersachsen, Holland and Engelland*, 3 vols. (Ulm, Memmingen: Gaum, 1754), 3: 674–77. The French copy is kept by the Amsterdam University Library; the Dutch copy was taken apart long ago.

7 Obreen 1877–1890, 7: 158. The text is not clear on the exact technique. It only mentions a 'privilege for prints and maps (...) in black or coloured'.

8 See <http://www.kb.nl/bladerboeken/admirandorum-quadruplex-spectaculum> (accessed 18 March 2013). The publication date of Schenck's *Admirandorum* is derived from the dedication to Friedrich August I, Duke of Saxony (1670–1733), who reigned from 1694 and became August II, King of Poland in 1697.

Nederlandse huizen en lusthoven in or shortly after 1697.⁹ Exactly when Danckerts published his plates is not known, nor is there any indication that he published them as part of a larger series. We shall examine the ways in which these publishers explored the commercial possibilities of a new technique and address the question why colour printing seems to have been especially popular for topographical prints. Five business strategies will come to light: product innovation, product differentiation, product protection, copying and collaboration.¹⁰

Petrus Schenck

Schenck Valck and Allard's shops were situated closely together. Between 1690 and 1706 Schenck was at the Beurssluis, just around the corner of Dam square. Valck was only a few steps away on Dam square, at 'In de wakkeren hont' (1694–1715). Allard was on Dam square near the Beursstraat (1673–1708).¹¹ They also would have known each other well from the book and print sellers' guild. In other words, each knew exactly what the others were doing.

Between 1694 and 1697 Schenck published the *Admirandorum* series in both black and white and in colour, which must have been among the first colour intaglio prints to appear in Amsterdam, if not the first. It is likely that the colour edition was the deluxe edition, a form of product differentiation. The series comprises of

72 prints of the same dimensions, which fall into five groups: an engraved title plate; 19 views along the Rhine; 25 views of Stadholder-King William III's estate Het Loo and country houses around The Hague; 10 views of The Hague; and 17 of Amsterdam. The chronology of production has not been identified, but, given the explicit reference to colour in the request for a privilege,¹² 1695 must be the *terminus post quem* for the colour editions. The title page indicates that the subjects were selected, designed and etched by Jan van Call,¹³ whose oeuvre consists of topographical prints, highly detailed drawings, plans and maps. His clear and linear style was well suited for a descriptive rendering of architecture and completely different from the popular, loosely drawn etchings of Romeyn de Hooghe and his followers.

Van Call cooperated with both Teyler and Schenck so he may have been the link between Teyler's new technique and Schenck's initiative for a colour-printed edition of the *Admirandorum*.¹⁴ Van Call, like Teyler, was born in Nijmegen and moved to Amsterdam in 1688, where his son Jan was baptised on 17 April 1689 with Teyler as witness.¹⁵ Between 1691 and 1692 he left Amsterdam for Rijswijk (near The Hague), where he probably died in 1706. Teyler lived and had a print shop in Huis Te Blotinge (near Rijswijk) from c.1693 until 1 May 1696, and it is likely that Van Call collaborated with him there.¹⁶ At the same time, Van Call maintained contact with Schenck and Valck: on 29 July 1705 he declared that he had made a payment to the States of Holland and West Frisia on Schenck and Valck's behalf 'about eight years ago',¹⁷ probably related to their application of a privilege for printing in colour in 1695.

Colours were applied to the plates meticulously by an anonymous plate printer. Streets, rocks and soil on the foreground are mostly inked in brown; blue is used for skies, rivers, canals and rooftops; green for foliage and

9 The description of print no. 16 mentions the peace negotiations at the Royal Palace at Rijswijk that took place from 9 May to 21 September 1697 and ended the Nine Years War (1688–97); M. Rikken, 'Vroege kleurendruk in Amsterdam. Een onbekend zeventiende-eeuws plaatwerk van Carel Allard', *De boekenwereld* 24.4 (2008), 218–19. The publication dates from before 1706, when Carel Allard handed over his copperplates to his son Abraham Allard just before he went bankrupt, M.M. Kleerkooper and W.P. van Stockum, *De boekhandel te Amsterdam voor-namelijk in de 17de eeuw. Biografische en geschiedkundige aantekeningen*, 2 vols. (The Hague: Nijhoff, 1914–16) 2: 1127, 1129–30.

10 On Amsterdam print publishers, see Kolfin, *Gedrukt tot Amsterdam*. On book publishers, many of whom also published prints, see Rasterhoff, *Fabric of Creativity*. On print publishing around 1700, see G. Wuestman, 'De Hollandse schilderschool in prent: studies naar reproductiegrafiek in de tweede helft van de zeventiende eeuw' (PhD diss., University of Utrecht, 1998), 143–77, and C. Schuckman, 'Dutch Prints and Printmaking', in R.P. Macubbin, M. Hamilton-Philips, *The Age of William III and Mary II: Power, Politics and Patronage* (Williamsburg: The College of William and Mary in Virginia, 1989), 281–91.

11 Addresses from Short Title Catalogue Netherlands, accessed 18 March 2013, <http://www.kb.nl/stcn/>.

12 See note 8. The privilege was granted for 15 years on 24 September 1695.

13 See P. Vis, 'Jan van Call (1656–1706)' (unpublished MA thesis, University of Amsterdam, 2012).

14 For example, the views of Rheinfells and Caub that Van Call produced for Teyler are similar to those views he made for the *Admirandorum*.

15 Amsterdam, Municipal Archive, Doopboek Amstelkerk, entry no. 378.AK A08622000042.

16 The Hague, Municipal Archive, Notarieel Archief, no. 708,181–82. A.D.A. Monna, 'Opnieuw Johannes Teyler', *Jaarboek Numaga* 32 (1985), 11–13. The source is a letter of 8 June 1694 from Christiaan Huygens to Gottfried Wilhelm Leibniz; *Gottfried Wilhelm Leibniz: Sämtliche Schriften und Briefe*, various eds, vol. I,1 – ... (Berlin: Akademie-Verlag, 1923–...), III.6 (2004), 108, no. 40.

17 The Hague, Municipal Archive, Notarieel Archief, no. 552, 693–94.

shutters; and reddish brown for brick walls and windows. Figures are generally rendered in blue and bright red with brown details. Significantly, The colour inking in a number of Van Call's topographical designs and colour prints (which were often additionally hand-coloured) is similar to those in Schenck's colour prints, which strongly suggests Van Call's designs were examples for the plate printer (Figs. 19.1, 19.2).

But the colours were not only there for sheer novelty, embellishment or realism. Especially in the palace and city views, they improve the legibility of the design by enhancing the sense of depth and by bringing out architectural details like the windows and the decoration of the façades. Schenck will have noticed that their linear character made topographical prints better suited for colour printing than the narrative genres which were

usually more tonal, therefore demanding more nuanced colouring that could be better achieved through hand-colouring.¹⁸

Gerard Valck

Schenck's business partner and brother-in-law Gerard Valck similarly produced a topographical series in black and white and in colour. His use of a technique that Schenck had debuted in Amsterdam does not appear to have frustrated Schenck and was perfectly legal. They jointly applied for and received the privilege for colour printing, and the content of Valck's series is notably different.



FIGURE. 19.1 *Jan van Call, View on the Binnenamstel, 1688–90, etching inked à la poupée with additional hand-colouring, 33.5 × 50.2 cm*
AMSTERDAM, MUNICIPAL ARCHIVE, 010097015469

18 See also C.S. Ackley, 'The Quest for Printed Tone', in *Ibid.*, *Printmaking in the Age of Rembrandt*, exh. cat. (Boston: Museum

of Fine Arts; Saint Louis: Saint Louis Museum of Art, 1980–81), xxvii–xlvi.



FIGURE. 19.2 Jan van Call, View on the Binnenamstel, etching inked à la poupée, 13.1 × 17.0 cm. In: *Admirandorum Quadruplex Spectaculum* (Amsterdam: Petrus Schenck, 1694–97), pl. 66
THE HAGUE, ROYAL LIBRARY, 2211 B 24

The full title of his *Vues et Perspectives* gives a clear idea of the contents: 'Views and Perspectives of Loo, Honselaarsdyk, Soesdyke [and] Castles and Pleasure Palaces of the King of Great Britain, to which have been added Views of the Areas around Cleves'. The 64-print series had a different concept than Schenck's *Admirandorum*; it focussed on the estates of William III. The only overlap between the series were images of Het Loo, but Valck's prints are completely different in selection and details.¹⁹ *Vues et Perspectives* celebrated William's splendour to such an extent that it could have functioned as Williamite propaganda and may have

even been targeted at sympathisers of the Orangist faction, whereas Schenck's series was more politically neutral and of general interest.

Valck described his series on the title page as etched by *les plus habiles Maîtres* (the best masters). At least two hands can be distinguished: one for most prints of Honselaarsdijk, Soestdijk and Cleves (Fig. 19.3) and another for the series of Het Loo (Fig. 19.4) and some prints of the first group. The designs in the latter group are more schematic (see especially the clouds and the sculpture) and are more evenly etched, i.e. with less tonal variation. This restrained and regular style works well enough in the depiction of architecture, but the engraver had some difficulty with perspective. The Soestdijk, Honselaarsdijk and Cleves series are of better quality but cannot be attributed easily either. Bastiaan Stoopendaal is a likely candidate; he is known to have

¹⁹ This is also borne out by the typography of the title page. Het Loo, Honselaarsdijk and Soestdijk, all owned by William III, are in large red and black capitals while Cleves is in small roman type, suggesting the addition was an afterthought or an appendix.



FIGURE 19.3 Abraham Stoopendael (?), The Large Fountain [in the Gardens of Honselaarsdijk Palace], etching inked à la poupée, 13.1 × 16.5 cm. In: *Veues et Perspectives* (Amsterdam: Gerard Valck, 1695), pl. 8b
THE HAGUE, ROYAL LIBRARY, 357 F21:2

worked for Valck and his rendering of skies, for example, resonates with that in the prints of Soestdijk, Honselaarsdijk and Cleves.²⁰

The difference in quality between the two groups also recurs in the choice of colours, which is consistent in all known copies. In the series of *Het Loo* the green ink (now) has a blueish tone, while brown tends towards red and is rather crudely applied. Flat areas of colour appear duller because the etching is more even and less detailed. A little mistake recurs in the hand of a statue of Venus: it is green, like the adjacent foliage, rather than brown like the rest of the statue (Fig. 19.4). The coloration of the other sets is remarkably close to that in Schenck's *Admirandorum*: two tones of green are used (a lighter one for sky and foliage in

the background and a darker one for foliage in the foreground) and the brown is much softer than in the prints of *Het Loo* (Fig. 19.3). The application of colour is, in general, more refined. For instance, small details like fans and hats, are inked individually.

This difference between Valck's *Het Loo* series and his other three sets and the similarity of the colouring of those three to Schenck's *Admirandorum* are revealing, especially in light of Valck and Schenck's joint application for a privilege. Collaboration on expensive projects was quite common and may have been the case here.²¹ It is possible that the partners produced everything except Valck's plates of *Het Loo* together and had them printed in the same workshop. It is also likely that they divided the

20 View of the Gardens of *Het Loo*, H. 23; View of *Soestdijk*, H. 24.

21 Kolfin, *Gedrukt tot Amsterdam*, 33–35.

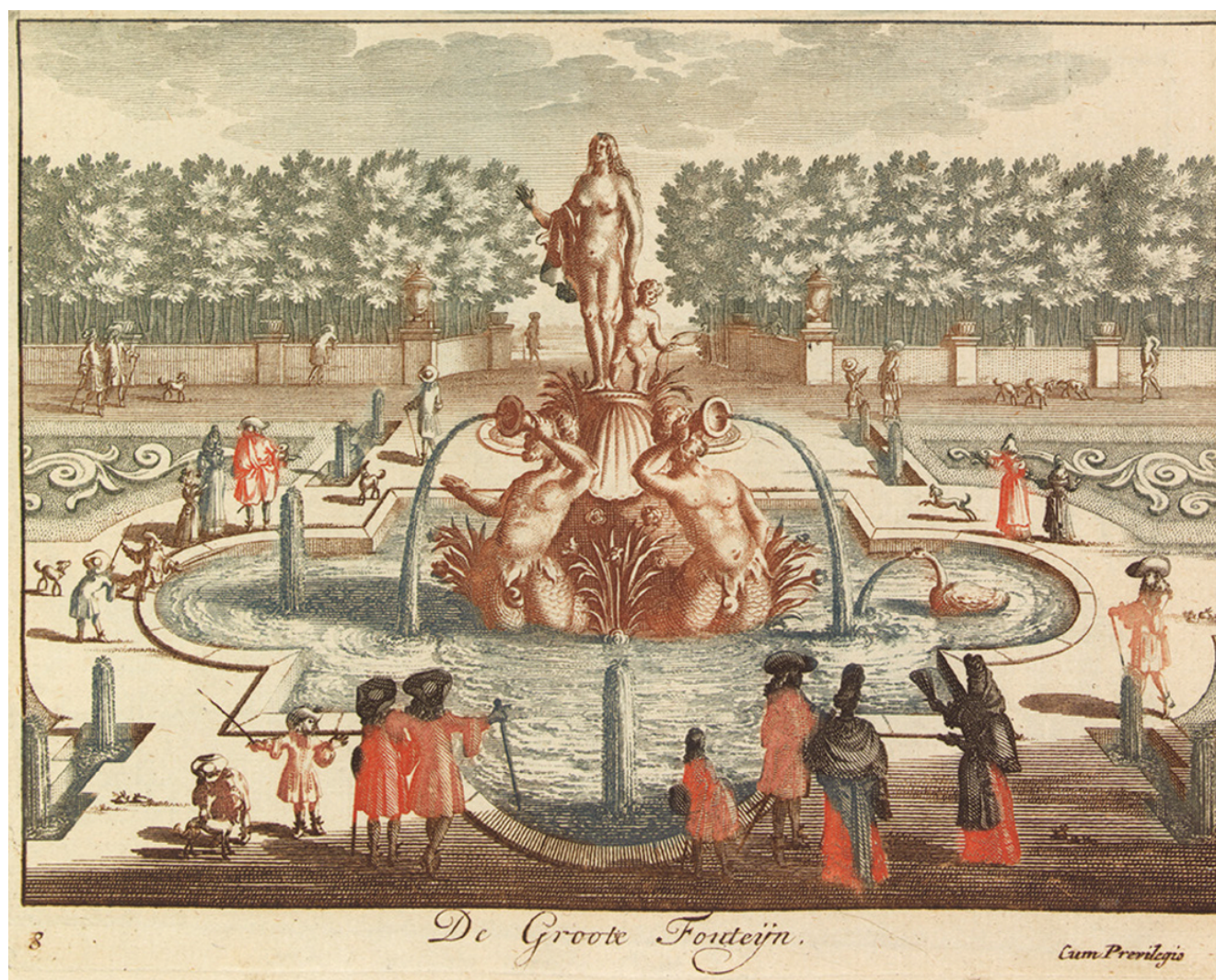


FIGURE 19.4 Anonymous, The Large Fountain [in the Gardens of the Palace Het Loo], etching inked à la poupée, 13.0 × 16.4 cm. In: *Veues et Perspectives* (Amsterdam: Gerard Valck, 1695), pl. 8
THE HAGUE, ROYAL LIBRARY, 357 F21:1

plates between themselves: Rhine, Het Loo, Amsterdam and The Hague went to Schenck Soestdijk, Honselaarsdijk and Cleves went to Valck. At a later point Valck must have decided to add a series of Het Loo, presumably for commercial reasons. Valck had high expectations: he gave it prime importance on the title page, as the series is the first to be mentioned and was printed in large red type.²² Since he did not have the copperplates, he had new ones made by an anonymous minor master, had them printed in colour, and opened his Orangist topographical series with them.

By offering other views and details of Het Loo than Schenck he made his series attractive for buyers who already had colour-printed images of Het Loo from Schenck's *Admirandorum*.

Despite the difference in quality, Valck's series were made as one coherent collection. The images are more or less the same size, and stylistic differences are minimal and clearly accidental. However, this does not mean the prints could not be sold apart. Valck added a title page to each series, making it easier to sell these separately, pre-

22 Prints of Het Loo were popular. Except for the series discussed here, sets were produced by Romeyn de Hooghe (first published by Pieter van Persoy), by an anonymous engraver (published by Cornelis Danckerts), by Petrus Schenck after Jacob Roman (the architect who oversaw the construction and the extension, and

published by Schenck) and by Laurens Scherm (published by Carel Allard between 1702 and 1708). See also J.R. ter Molen, *'t Konings Loo. Een serie prenten met gezichten van Paleis het Loo en zijn tuinen* (Alphen aan den Rijn: Canaletto/Repro-Holland, 2005), 5–18.

sumably at a proportional fraction of the price of the entire series. It is another example of product differentiation, enlarging the market for expensive print series.

Carel Allard

Allard was the third to publish a colour-printed topographical series, which series has all the marks of a quick capitalisation on the success of his competitors. Carel Allard was the son of engraver and publisher Hugo Allard, who had come to Amsterdam from Tournai in 1645. Carel published anything that was in demand: maps, topography, ethnography, newsprints and restrikes of old plates of artistic prints, many of which seem to have come from his father's stock. Around 1700 he specialised in political satire, for which he reworked old plates and commissioned new ones.²³

Allard's *Toneel*, or 'Scenes of Prominent Dutch Houses and Orchards', contains 55 prints. Following the Marottesque title page are 12 prints of the gardens of Het Loo, 12 views of The Hague and surrounding country estates and 30 views and buildings in and around Amsterdam. The plates differ in size and the groups are not separated by title pages.²⁴

The different sizes and age of the plates, some of which were already quite old,²⁵ suggest that the series is a compilation. Those of The Hague were by Cornelis Elands and first appeared in Jacob vander Does's *Gravenhage, met de voornaemste plaetsen en vermaecklijckheden* from 1668, published in The Hague in two editions: one by Johannes van Tongerlo and one by Hermanus Gael. Six prints of country estates near Amsterdam designed by Johannes Leupenius had been

published anonymously around 1670.²⁶ Allard's plates of Het Loo were etched by the Amsterdam engraver Laurens Scherm, who had been a student of Romeyn de Hooghe. They must date from or after 1692 as they show colonnades that were moved to the back of the garden that year.²⁷ Allard's prints of Amsterdam churches and towers were copies after Jan Veenhuysen's originals that were first published around 1664. When these copies were made is not known, but Allard may have commissioned them for his *Toneel*. Most plates were quite worn when Allard gave them a new life by printing them in colour. In this case, colour printing would seem to be an example of simple but effective product innovation.

Allard's title page indeed mentions 55 copper plates, but the number '55' is inscribed with pen and ink in a place that was left blank for the purpose. This indicates that Allard provided the buyer with the possibility of compiling his own series of whichever prints he desired.²⁸ One of the three known copies²⁹ seems to confirm this: the Fondation Custodia copy lacks a title page and index and consists of only 24 plates, from which the views of Amsterdam are entirely missing, which gives this particular collection a consistent focus on country estates.³⁰

The choice of colours is virtually identical in all three copies. Tonal differences seem to be the result of different ink compositions. The red of some houses in the Paris copy is more saturated than that in the Amsterdam and New York copies, where it is of a browner hue, and the blues and greens of the Paris version are brighter. Some details are also inked in a different colour: in the *Huys te Ryswyk*, for example, the rooftops of the gate buildings are red in the New York and Paris copies (Fig. 19.5a), but blue in the Amsterdam one (Fig. 19.5b).

23 J. Spaans, 't Hof, *'Het beroerde Rome': Spotprenten op de paus, in een pleidooi voor een 'Nederlandse' katholieke kerk, 1705–1724* (Hilversum: Verloren, 2010); R.A. Skelton, ed., *Carolus Allard Orbis habitabilis Oppida et Vestitus (The Towns and Costumes of the Inhabited World)* (Amsterdam: Theatrum Orbis Terrarum, 1966).

24 The series of Het Loo measures c.165 × 200 mm. One of the prints of The Hague shows the Hof van Holland (c.170 × 204 mm), which is bigger than the The Hague estates (c.116 × 168 m). Measurements of other series are: Amsterdam City Hall, c.158 × 191 mm; Amsterdam churches and towers c.123 × 146 mm; Amsterdam canals c.170 × 200 mm; country estates c.157 × 213 mm.

25 M. Rikken, 'Vroege kleurendruk in Amsterdam. Een onbekend zeventiende-eeuws plaatwerk van Carel Allard', *De boekenwereld* 24.4 (2007–08), 202–26, esp. 205–14.

26 Three date from 1668, one from 1671 and two are undated but must be from before 1693, when Leupenius died.

27 The colonnades at the back of the garden are visible in fol. 9, 'De Fontein van Hercules'.

28 The copy in New York, Metropolitan Museum of Art, is comparable to that of Amsterdam except that 14 prints are missing. Blank pages are inserted instead.

29 Copies are kept in Amsterdam, University Library; New York, Metropolitan Museum of Art; Paris, Fondation Custodia.

30 All plates but one were also used for the copy in the Amsterdam University Library. The exception is a print of the Vijverberg called 'het Hoff', which differs from the 'Hof van Holland' print in the Amsterdam copy.



FIGURE. 19.5A *Anonymous copy after Cornelis Elands, Huys te Ryswyk (detail), etching inked à la poupée, 11.6 × 16.8 cm. In: Tooneel der voornaamste Nederlandse huizen en lusthoven (Amsterdam: Carel Allard, c.1697), pl. 16 NEW YORK, METROPOLITAN MUSEUM OF ART, 37.48*



FIGURE. 19.5B *Anonymous copy after Cornelis Elands, Huys te Ryswyk (detail), etching inked à la poupée, 11.6 × 16.8 cm. In: Tooneel der voornaamste Nederlandse huizen en lusthoven (Amsterdam: Carel Allard, c.1697), pl. 16 AMSTERDAM, UNIVERSITY LIBRARY, O 06-1739*

The lower foreground of this print shows a bright, purplish colour in New York and Paris that does not occur in any of the prints in Amsterdam, but is apparent in other prints in the New York and Paris copies, for example in those of Honselaarsdijk.

The patterns of inking suggest that Allard followed two procedures. It is strongly suggested that he produced series of impressions of single plates, resulting in similarly inked prints, which were then compiled into any collection a buyer desired. This process may have been repeated at a later stage, resulting in slightly different sets. It is also possible that he created sets on demand.³¹

Interestingly, the Paris copy has three prints that are present as both counterproofs and normal impressions,³² with a surprising difference in that of *'t Huis Spiring*. The normal impression has stairs leading to the front in red and blue, while the counterproof has the stairs in blue only, and thus is not pulled from this normal impression. The source of the counterproof is not known; it may have been inserted in another (unknown) copy or sold as a separate print.³³

Conclusions

That three Amsterdam publishers each issued colour-printed editions of a series of topographical prints in the final decade of the seventeenth century suggests high expectations for this new technique. The lack of follow-up suggests that they were overly optimistic about the market demand for printed colour or that the investment of time and/or materials required for colour printing was too great. There are indications that the publishers tried to be economical in the production; Schenck and Valck presumably cut costs by sharing the production and Allard saved by reusing old plates, as was his habit. Schenck and Valck tried to protect their investment with a privilege (apparently without much success). Selecting topography, well suited for colour printing as we saw, was a way of minimizing the risk: it was an established and popular genre. Another way to minimise risk was offering individual prints or sub-series, not just entire ready-made volumes. This made the doubtlessly expensive colour prints available to less affluent buyers and thus extended the market.³⁴

TABLE 19.1 *Colour-Printed Copies of Topographical Series by Allard, Schenck and Valck*

Publisher	Title	Date	Location	Series	Prints
Allard	<i>Tooneel der Voornaamste Nederlandse huizen en luthoven</i>	1697–1706	Amsterdam, University Library	7	55
Allard	<i>Tooneel der Voornaamste Nederlandse huizen en luthoven</i>	1697–1706	New York, Metropolitan Museum of Art	5	42
Allard	<i>Tooneel der Voornaamste Nederlandse huizen en luthoven</i>	1697–1706	Paris, Fondation Custodia	3	26
Allard	<i>'t Lust-hof van zyn britannische Majesteit [Het Loo]</i>	c. 1698	Chicago, Newberry Library	1	24
Schenck	<i>Admirandorum Quadruplex Spectaculum</i>	1694–1697	The Hague, Royal Library	4	72
Schenck	<i>Admirandorum Quadruplex Spectaculum</i>	1694–1697	St Petersburg, Hermitage Printroom	4 all fragmentary	30
Schenck	<i>Gardens and buildings of Het Loo</i>	1694–1697	Amsterdam, Rijksprentenkabinet	1	16
Valck	<i>Veues et perspectives</i>	1695	The Hague, Royal Library	4	65
Valck	<i>Veues et perspectives</i>	1695	New York, Metropolitan Museum of Art	4	64
Valck	<i>Veues et perspectives de Soesdyk</i>	1695	Amsterdam, Rijksprentenkabinet	1	16

31 One obvious example of colour printing on demand is Cornelis de Bruijn's *Reisen door de vermaardtse deelen van Klein Asia*; see note 7.

32 These are *'t Huis ter Nood*, *'t Huis te Rijkdorp* and *'t Huis Spiring*.

33 The texts on all counterproofs are handwritten. The author who wrote 'Spiring' under this proof corrected the engraver's

mistake. Impressions from the plate read 'Spring', with a little mark indicating an extra 'i' above and between 'p' and 'r'. Indeed the print is called '23. the home of mr. Spiring' in the Amsterdam index.

34 The sale prices of these colour prints are not known.

Jacob Christoff Le Blon and the Invention of Trichromatic Colour Printing, c.1710

Ad Stijnman

Shortly after 1700, Jacob Christoff Le Blon, a miniature painter working in Amsterdam, revolutionised colour printmaking.¹ He did not mix colours, as his contemporaries working in the *à la poupée* manner developed by Johannes Teyler, but instead invented a way to overprint transparent layers of the three primary colours (blue, yellow and red, in that order) in exact proportions that allowed any desired gradation to be achieved (Fig. 20.1); he later printed a fourth black or extra blue inked plate first to enhance contrast. Until this breakthrough, the best way to achieve precise colours was to apply individual inks, as in *à la poupée* printing, and allow the lines of opaque colour inks to interact with the white of the paper. But now a large range of colour gradations could be produced from three or four plates being printed on top of each other in transparent primary colours, with both the lower ink layers and the white of the paper shining through to create a joint hue, like glazing in painting. This technique produced intermediate tinges and offered various possibilities for new results and aesthetics.

It is often said that Le Blon merely followed Isaac Newton's research,² but this is untrue. Le Blon referred to Newton in his *Coloritto* where he, rightly, mentions that the mixing of various colours of 'light' will create white light 'as the great Sir Isaac Newton has demonstrated in his *Opticks*,'³ but Le Blon was 'only speaking of Material Colours, or those used by Painters'. Staying close to Aristotelian tradition as concerns divisions in seven (such

as in musical notes), Newton observed the behaviour of light and distinguished seven colours from white light divided by a prism, with an extra area called 'E' between red and orange. Le Blon, on the other hand, reduced the available painter's palette to three basic colours. His aim was to reproduce oil paintings in order to make good money, for which he developed a manner of overprinting the three primary colours from three mezzotint plates thereby creating composite hues. The *Opticks* could not have helped him with this, as Newton did not postulate a trichromatic colour theory,⁴ did not discuss the mixing of paints or inks in primary colours, and was not interested in art techniques let alone printmaking practice. Le Blon's contemporaries writing about his colour prints and working method correctly understood the difference and did not attribute to Newton a distinction of the three primary colours or of a colour theory.⁵

The Newton-Le Blon link appeared only in 1749, eight years after Le Blon's death, when his pupil Jacques-Fabien Gautier-Dagoty perhaps misunderstood or confused the ideas of his master and Newton.⁶ He first stated that Le Blon tried applying Newton's theory to painting ('*Le Blond ...essaya d'appliquer à la Peinture la théorie du grand Newton sur les couleurs*') and that he next invited engravers to apply this to printmaking; later in the letter, he correctly quotes from *Coloritto*. From this followed a long history of confusing Newton's theories about light and Le Blon's practical approach.

With Le Blon's process, colour printing moved forward into modernity. Three- or four-colour intaglio

1 On the spelling of Le Blon's given names, see the Foreword, x, nt. 8. For an extensive discussion of Le Blon and his followers, see A. Stijnman, *Engraving and Etching 1400–2000: A History of the Development of Manual Intaglio Printmaking Processes* (London: Archetype; Houten: Hes & De Graaf, 2012), 341–65. For an overview of the relationship of his invention to process printing, see Matthew Young, ed., *The History of Process Color Printing* (in progress for 2015).

2 For a typical reference, see A.M. Hind, *A History of Engraving & Etching from the 15th Century to the Year 1914*, 1923; reprint of the 3rd ed: New York: Dover, 1963), 307.

3 J.C. Le Blon, *Coloritto; or the Harmony of Colouring in Painting: Reduced to Mechanical Practice under Easy Precept, and Infallible*

Rules = L'harmonie du coloris dans la peinture; reduite en pratique mécanique et à des regles sures & faciles (London: Le Blon, [1725]), 6–7.

4 A three-colour theory for light was first proposed by Thomas Young in 1801; H. Lang, 'Trichromatic Theories before Young', *Color, Research and Applications* 8 (1984), 229.

5 C. Mortimer, 'An Account of Mr. James Christopher Le Blon's Principles of Printing, in Imitation of Painting, and of Weaving Tapestry, in the same manner as Brocades', *Philosophical Transactions*, 57 [=37] (1731/1732), no. 419 (June/July), 101–07, esp. 101–02.

6 J.-F. Gautier-Dagoty, 'Lettre de Gautier à M. de Boze ... sur la Gravure des Coeleurs', *Mercure de France* (July 1749), 158–72, esp. 160–61, 166–67 (quoting Le Blon, *Coloritto*, 7, 9).

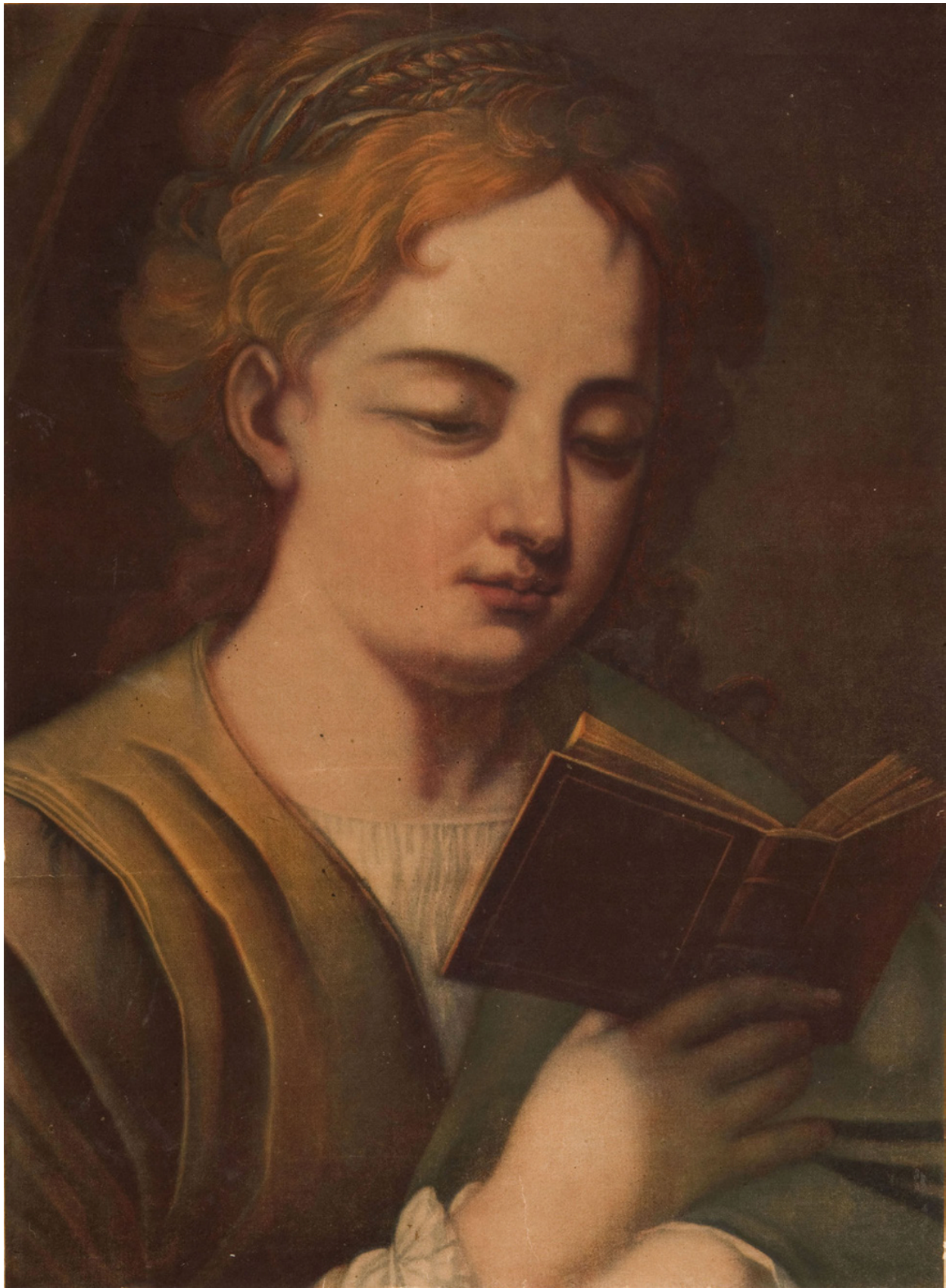


FIGURE 20.1 *Jacob Christoff Le Blon, after Antonio Allegri da Correggio, St Catherine Reading, c.1720, mezzotint printed in blue, yellow and red ink from three plates, 44.3 × 32.2 cm*
BRAUNSCHWEIG, HERZOG ANTON ULRICH-MUSEUM, KUNSTMUSEUM DES LANDES NIEDERSACHSEN;
PHOTO © MUSEUMSFOTOGRAF

printing was further refined in the eighteenth century by French printmakers, nearly extinguished after 1800 and re-introduced in other graphic techniques in the nineteenth century, especially in chromolithography.⁷ The trichromatic process proved the most successful and accurate way to reproduce natural colours in the printing trade and analogue photography, and it remains so

such as in present-day desktop colour printers and image processing software (e.g. the CMYK and RGB systems respectively). Le Blon's concept has become a technical process fully established in the printing trade, with modern colourants and technologies allowing anyone to achieve reproductions that are more true-to-life than he could have imagined.

⁷ French privilege to Godefroy Engelmann of 31 July 1837, no. 8848, with an addition for changing 'Lithocolore' to 'Chromolithographie' on 27

March 1838; O.M. Lilien, *Jacob Christoph Le Blon, 1667–1741, Inventor of Three- and Four Colour Printing* (Stuttgart: Hiersemann, 1985), 124–27.

Chronology: Developments in Colour Printing 1400–1700

This selective survey lists key developments in colour printing from the first recorded instructions for stamping on fabric in the fourteenth century until the invention of three-colour printing c.1700. It encompasses all categories of printed material, including book illustrations, single-sheet prints and decorative art, and all colour printing techniques known to have been used to issue images in colour. Given the scope, it is necessarily

selective; some entries were recognised as landmarks by contemporaries, some were not, and some now provide scholars with a useful point of comparison. This timeline challenges the accepted chronology of the development and dissemination of many colour printmaking techniques by showing they followed earlier precursors, were used far later, and/or were practiced concurrently with techniques that are typically considered outdated or more advanced. When relevant, citations are given to primary documents. Entries about the history of the terminology are indebted to René Verbraeken, *Clair-obscur, – histoire d'un mot* (Nogent-le-Roi: Jacques Laget, 1979).

1300s

LATE 1300S–EARLY 1400S

Fabrics are stamped with woodcuts inked in different colours; this was practiced from antiquity, but of medieval examples the best known may be the 'Sion Tapestry' (northern Italy, 1375–1400) in red

and black and the linen chasuble now in the Kulturhistorisches Museum Rostock (c.1420/30, northern German lands) in black, red, green and gold.

1400s

C.1400, FLORENCE

The artist Cennino Cennini compiles an artisan's manual, including recipes for relief printing ink and instructions for stamping inked woodcuts on fabric; such manuals with recipes and instructions for (colour) stamping on fabric, leather and/or paper, were compiled throughout the fifteenth century, especially in the German lands.

1452–55, MAINZ

The printer Johann Gutenberg invents moveable type and prints rubrics in red in some copies of the first book printed in a press, *Biblia latina* (Mainz: Johann Gutenberg, c.1452–55).

1457–90, MAINZ

The printers Peter Schöffer, Johann Gutenberg's former apprentice, and Johann Fust print bicolour (mostly red-blue) jigsaw metalcut initials (including one in the manner later known as *à la poupée* in 1457 and again in 1459) throughout the second book ever printed, *Psalterium* (Mainz: Johann Fust and Peter Schöffer, 14 Aug. 1457); Schöffer continues to use them over the next 30 years until 1490.

1460–80, SOUTHERN GERMANY?

At least one pastepoint is (presumably) printed in red, *Christ in the Winepress* (Schr. 2813).

1465–67, UPPER RHINE

The artist Master ES creates the first engraving that is designed to be printed in a non-black ink; all surviving impressions are in white ink on black prepared paper.

1470, GERMAN LANDS AND ITALY

Printers' devices and printers' decorations in relief are increasingly printed in monochromatic red.

C.1475–1520, ITALY

Some engravings of designs for decorative objects are printed in monochromatic blue, brown and green.

C.1476, COLOGNE

The printer Nicolaus Götz produces (by rubbing) the first engravings printed in two colours and the first colour-printed images in a book, one in monochrome red and another in varying combinations of monochromatic red and black, in Lazarus Beham, *Buch von der Astronomie* (Cologne: Nicolaus Götz, c.1476); see 1572.

1476, ROME

The printer Ulrich Han prints the first two-colour music notation (black notation on red staves) in *Missale Romanum* (Rome: Ulrich Han, 12 October 1476).

1482–87, VENICE; 1487–1515, AUGSBURG

The workshop of the printer Erhard Ratdolt in Venice (until 1487) and in Augsburg (after 1487) issues woodcut book illustrations in up to five colours, as well as printers' devices in red and black, almost all with an independent key block in black and flat areas of tone; some of his colour blocks remain in Venice and are later printed in colour by Venetian printers; in the

1490s, the young artist Hans Burgkmair designs woodcut book illustrations that Ratdolt prints in colours.

1486, ST ALBANS

The Schoolmaster Printer illustrates dozens of coats of arms in up to four colours in the 'Boke of blasynge of armys' in the *Book of Hawking, Hunting, and Heraldry* [Book of St Albans]

1500s

1500, VENICE

The printer Zacharias Kallierges prints decoration, a title and a decorated initial in gold (with gold leaf applied to a sticky printed layer, presumably uncoloured oil varnish) in Ammonius Hermiae, *Commentarii in quinque voces Porphyri* (Venice: Zacharias Kallierges, 1500).

1503–05, FLORENCE

Leonardo da Vinci records the earliest known description of what later became called 'nature printing', describing a technique of inking a sage leaf in white ink and printing it in relief onto black prepared paper; *Codex Atlanticus*, fol. 72^v.a.

1507, WITTENBERG

The artist Lucas Cranach creates the woodcut *St George* (and at least one other that does not survive) from a key block in black and a highlight block in gold (and, in lost impressions, possibly silver), for his patron Friedrich III the Wise, Elector of Saxony; Friedrich III the Wise has impressions sent to Konrad Peutinger in Augsburg.

1508, AUGSBURG

In response, Konrad Peutinger has the artist Hans Burgkmair create the woodcuts *St George* and *Maximilian I* with a key block in black and a highlight block in gold (or gold and silver, inked in what was later known as *à la poupée* printing). In September, Peutinger sends impressions to Friedrich III the Wise, Elector of Saxony and Georg the Bearded, Duke of Saxony; Konrad Peutinger, letter to Friedrich III, 24 September 1508; *Ibid.*, letter to Georg the Bearded, 25 September 1508.

1508, AUGSBURG

The highlight blocks of Hans Burgkmair's *St George* and *Maximilian I* are replaced with tone blocks from which highlights were cut to allow the white of the paper to act as a third colour in the design, making them the first known colour woodcuts with tone blocks from which the highlights were removed from the tone blocks.

1510, AUGSBURG

Hans Burgkmair creates the three-block woodcut *Lovers Surprised by Death*, the first colour print created from interde-

(St Albans: Schoolmaster Printer, not before 1486); it is the only recorded example of printing in more than two colours in Tudor England.

1490s

Artists, including Mair von Landshut, create prints in black ink on prepared paper with highlights painted in white and yellow.

pendent matrices; all three are tone blocks, so this is also the first print created from tonal contrast alone.

1510–14, STRASBOURG

The artists Hans Baldung (Grien) and Hans Wechtlin produce a number of sophisticated two-colour printed woodcuts, and a third block was added to later impressions of Wechtlin's woodcuts.

1510–30, STRASBOURG

The printer/publisher Johann Schott prints two- to three-colour woodcut title pages and maps in books he issues.

C.1510–1700

Printers in regions including England, France, the German lands, Italy, the Netherlands, Portugal, Spain, Switzerland (and later in colonies including Mexico) issue pictorial elements in books in two colours, namely title vignettes, title borders, printers' decoration and printers' devices in red and black.

1512, AUGSBURG

In the earliest recorded description of the production of a colour woodcut, the blockcutter Jost de Negker is first attested in the imperial service of Holy Roman Emperor Maximilian I, stating in a letter to Maximilian I that he is cutting the three blocks ('*drei formen*') for Hans Burgkmair's three-colour woodcut *Hans Paumgartner* (dated 1512 in the block); Jost de Negker, letter to Maximilian I, 27 October 1512.

1514, VENICE

Engravings by Girolamo Moceto printed either in red or blue ink are issued as book illustrations in Ambrogio Leone Nolanus, *De Nola* (Venice: Giovanni Rosso, 1514).

1516, VENICE

The artist Ugo da Carpi applies for and is granted a privilege for printing woodcuts in '*chiaro et scuro*' on 24 July (Introduction, Fig. 1, p. 6), the first recorded use of the term in reference to colour printing; Venice, Archivio di Stato, Notatorio di Collegio, registro 18, 7 March 1515–27 August 1520, c. 39; also in Venice, the

artist Lucantonio degli Uberti produces a two-colour woodcut copy of Hans Baldung's *Preparation for the Witches' Sabbath* (1510) dated 1516 in the block.

1518, ROME

Ugo da Carpi acquires the first privilege for specific colour woodcuts, a papal privilege for his chiaroscuro woodcuts *Aeneas and Anchises* and *Death of Ananias*.

C.1519–20, REGENSBURG

The artist Albrecht Altdorfer produces a six-colour devotional woodcut, the *Schöne Maria von Regensburg*, which involves more tone blocks than any print issued until that point.

1520, AUGSBURG

The woodcut coat of arms of Matthäus Lang von Wellenburg, Cardinal and Prince-Archbishop of Salzburg, is printed from seven blocks in seven colours (including gold) as the frontispiece to *Liber selectarum cantionum*, ed. Ludwig Senfl (Augsburg: Sigmund Grimm and Marx Wirsung, 1520); it involved more tone blocks than any other early modern colour woodcut.

C.1525, ROME

The earliest known intaglio example of what later became known as *à la poupée* printing was created when an impression of Agostino Veneziano's engraving *The Madonna Adored by Saints of the Dominican Order* was printed in red and blue ink.

1527, LONDON

The printer Peter Treveris issues a book with a title vignette that is not only the first known woodcut printed in register in early modern England, but also the only with interdependent matrices, in Ranulf Higden, *Polychronicon* (Southwark: Peter Treveris for John Reynes, 1527).

1528, VENICE

The first printed use of '*chiaro & scuro*' in Italian is recorded, but it is not in reference to colour printing; Baldassare Castiglione, *Il libro del Cortegiano* (Venice: Vettor de Rabani e compagni, 1528), np [towards the end of *libro primo*].

C.1530, BOLOGNA

The first colour print to combine a woodcut tone block and an intaglio keyplate is created when an impression of *Peter and John Healing the Lame Man at the Beautiful Gate* by Parmigianino or his circle is issued with a greyish woodcut tone block overprinted with an etched keyplate with the design in black.

1543–48, FONTAINEBLEAU

The first single-sheet colour prints are produced in France; Italian artists decorating the French royal palace at Fontainebleau

produce etchings printed in monochromatic brown or purplish red, and the artist Master ND produces a group of chiaroscuro woodcuts.

C.1550–1600/1650

Woodcuts are printed in colour (usually two to three wood-like browns) to imitate intarsia, and they are pasted onto wooden furniture and panels alongside monochromatic grained papers that were presumably stamped; most surviving impressions are by or after the Bavarian artist Erasmus Loy.

1550, FLORENCE

The 'first art historian' Giorgio Vasari states that Ugo da Carpi was the 'first inventor' of chiaroscuro printing ('*stampe di legno di tre pezzi*'), leading to confusion in the literature until the late nineteenth or early twentieth century; Giorgio Vasari, *La vite de' piu eccellenti pittori, scultori e architettori*, 1st ed., 3 pts. in 2 vols. (Florence: Lorenzo Torrentino, 1550), vol. 1, pt. 1: 109–10, 2, pt. 3: 659.

C.1550–C.1570, AUGSBURG

The artist Georg Matheus and his daughter Anna produce the first known single-sheet woodcuts in the style of Italian chiaroscuro in the German lands.

1555, ANTWERP

The artist Frans Floris de Vriendt designs the first single-sheet colour woodcuts produced in the Netherlands.

1557, ANTWERP

The artist and historian Hubert Goltzius, in conjunction with the blockcutter Joos Gietleughen, produces 131 illustrations each printed from an etched keyplate (or, rarely, a woodcut) in black and one or two woodcuts in different hues of brown from which highlights had been cut out in his *Vivae omnium fere imperatorum imagines* (Antwerp: Gillis Coppens van Diest, 1557); no book printed in the next centuries contained more colour-printed illustrations, and it was published in German, Italian and Latin in 1557, in French in 1559 and in Spanish in 1560.

1563, LONDON

The first (and only) known early modern English intaglio prints issued in any colour besides black are the four engravings printed in monochromatic blue (now faded to grey or grey-blue) in the first edition of John Shute, *The first and chief groundes of architecture* (London: Thomas Marsh for John Shute, 1563).

C.1570, ANTWERP

The artist Frans Floris de Vriendt combines an etched black keyplate with a chiaroscuro tone block from which the highlights have been cut, bringing the style that Hubert Goltzius had introduced in 1557 to single-sheet prints.

1572, NUREMBERG

A jigsaw-plate etching by the artist Konrad Saldörffer is printed in red and black ink as the title plate to Nicolas de Nicolay, *Von der Schiffart und Rayss in die Türckey unnd gegen Orientt* (Nuremberg: Dietrich Gerlatz, 1572); it is the first intaglio book illustration printed in colours in a press; see c.1476.

1572, STRASBOURG

The artist Tobias Stimmer produces two sophisticated chiaroscuro woodcuts, the last dated single-sheet colour prints from the early modern German lands, for the printer Bernhard Jobin.

1600s**1615–30, AMSTERDAM**

The artist/printmaker Hercules Segers prints etchings in monochromatic blue, brown, green, grey, white and yellow on paper and fabric; only one impression in register (from two plates, in black and white) survives.

1620s, AMSTERDAM

The publisher Willem Jansz. Blaeu re-issues Albrecht Dürer's woodcuts *Rhinoceros* (1515) and portrait of *Ulrich Varnbüler* (1523) with one and two new tone blocks, respectively.

1623–30, PARIS

The German artist Ludolph Büsinck produces chiaroscuro woodcuts (most after drawings by Georges Lallemant; one after a painting by Abraham Bloemaert) for the publisher Melchior Tavernier; they are the only colour woodcuts that Büsinck is known to have designed and that Tavernier is known to have printed, and they were long thought to be the first colour prints produced in France.

1630s, ANTWERP

Flemish blockcutter Christoffel Jegher makes colour woodcuts after Peter Paul Rubens.

1632–35, PARIS

The first chiaroscuro intaglio prints are produced by the artist François Perrier, who prints two etchings, the keyplate inked in black and the highlight plate in white, on grey-brown paper.

1637, PARIS

The first privilege for colour intaglio printing is granted to Abraham Bosse and Charles Delafontaine; *Lettres patentes qui permettent aus sieurs Abraham Bosse graveur en taille douce, et Charles delafont[aine] d'imprimer sur toutes estoiffes de soje, papier, velin, parchemin, cuir, etc.* (Paris, 6 Janvier 1637), Bibliothèque Nationale de France, Paris, Coll. Delamarre, Ms. Fr. 21732, fol. 138^r–41^v; another copy: Archives Nationales, Paris, Autres series, 06.01.1637.XIa 8653, fol. 83; see 1645.

1588–90, HAARLEM

The artist Hendrick Goltzius produces eleven chiaroscuro woodcuts that prove extremely influential.

1593 AND 1595, STRASBOURG

The first known book illustrations printed in the manner later known as *à la poupée* are the jigsaw-plate etchings by the artist Wendel Dietterlin (in red and black ink) as the title plate to Wendel Dietterlin, *Architectura* (Strasbourg: Bernhard Jobin, 1593); in 1595, the title page of the second volume is produced in the same manner.

1645, PARIS

Abraham Bosse publishes the earliest description of printing multiple colours from two plates according to the system he devised with Charles Delafontaine in *Traicté des manieres de graver en taille douce sur l'airin* (Paris: Abraham Bosse, 1645), 72–75; see 1637.

1662, LONDON

John Evelyn's use of the term '*Charo Scuro*' in relation to Ugo da Carpi and colour printing is its first documentation in print in English; John Evelyn, *Sculptura: Or the History, and Art of Chalcography and Engraving in Copper* (London: for G. Beedle, and T. Collins, and J. Crook, 1662), 47.

1666, PARIS

The collector Michel de Marolles writes the first recorded use '*en clair obscur*' to refer to colour printing; in French, the formula '*clair-obscur en plusieurs couleurs*' is soon used to distinguish colour prints from prints designed with the dramatic visual effect of enhanced contrast and reduced palette in drawing and painting (the primary meaning of '*clair-obscur*'); Michel de Marolles, *Catalogue de livres d'estampes et de figures en taille douce*, 2 vols. (Paris: F. Léonard, 1666 and Paris: impr. de J. Langlois fils, 1672); see Michel de Marolles, *Le livre des peintres et graveurs*, nouvelle édition (Paris: Jannet, 1855), 145.

C.1670, AMSTERDAM

The silversmith and engraver Jan van de Velde IV creates a *Portrait of an Old Man* from two etchings printed in register in red and black.

1675, NUREMBERG

Joachim von Sandrart described chiaroscuro woodcuts but circumlocuted the term '*chiaroscuro*', suggesting that the term was not yet used in the German lands in reference to colour printing: '*die Art mit dreyen Stöcken in gelb und Weiß/ oder blau und weiß/ wie nicht weniger von schwarz und weiß durch Holzstöcke*

die Schatten/ wie auch die aufhochende Liechte zu drucken’ (the art of printing in woodcut the shadows and also the highlights with three blocks in yellow and white, or blue and white, not least from black and white); *Teutsche Academie der Bau-, Bild- und Mahlerey-Künste*. 2 vols. (Nuremberg: Jacob von Sandrart, 1675, 1679), Book III, Part II, Chapter II, 219.

1676, PARIS

The art theorist André Félibien gives the first definition of ‘*clair-obscur*’ in reference to colour printing in French; André Félibien, *Des principes de l’architecture, de la sculpture, de la peinture... avec un dictionnaire des termes propres à chacun de ces arts* (Paris: J.-B. Coignard, 1676), 592.

1683, LONDON

The printer Joseph Moxon publishes the first instructions for printing in relief in more than one colour (i.e., text in red and black in a common press); Joseph Moxon, *Mechanick Exercises: Or, The Doctrine of Handy-works* (London: Joseph Moxon, 1683), 328–30.

1700s

1703, LONDON

The word ‘*clair-obscur*’ is first documented in English in relationship to colour printing John Elsum, *The Art of Painting after the Italian Manner* (London: printed for D. Brown, 1703).

1688–97, AMSTERDAM, RIJSWIJK, ROTTERDAM (?)

Johannes Teyler is granted a privilege by the States of Holland and West-Friesland to print all kinds of subjects in colour (‘*met hare couleuren*’) on paper, parchment and fabric; The Hague, National Archive, Staten van Holland, 1572–1795, entry no. 3.01.04.01, 1640, 20 February 1688; from then until 1697, he finances a printshop specialising in *à la poupée* printing, of which over 600 unique engravings and etchings on fabric and paper survive.

1695, AMSTERDAM

The print publishers Petrus Schenck and Gerard Valck apply for and are granted a privilege for fifteen years by the States of Holland and West-Friesland to publish prints and maps in black or colours (‘*in swart ofte gecouleert*’); The Hague, National Archive, Staten van Holland, 1572–1795, entry no. 3.01.04.01, 1647, 24 September 1695; they are the first of the Amsterdam publishers to adopt Teyler’s technique and issue series of etchings and single-sheet mezzotints printed *à la poupée*.

1705–10, AMSTERDAM

Jacob Christoff Le Blon develops a method for printing mezzotints in register from three plates inked in blue, yellow and red in this order.

Glossary

This selective list of terms offers definitions specific to early modern colour printing, including some of the most common colourants.

A

À LA POUPEE INKING (French: ‘with a dolly’): One *MATRIX* is inked with more than one colour on different, adjacent areas and printed in one run; the *IMPRESSION* shows the different colours next to each other

ADDITIVES: One of the three key constituents of *INK*, along with the *COLOURANT* and *BINDING MEDIUM*; substances added to the *INK* to influence its properties and behaviour, including *DRIERS*, conditioners and extenders

AZURITE: Bright blue mineral *PIGMENT* (basic copper carbonate, $2\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$) usually occurs with *MALACHITE*

B

BEADED EDGES: See *INK SQUASH*

BINDING MEDIUM, also ‘carrier’ or ‘vehicle’: One of the three key constituents of *INK*, along with the *COLOURANT* and *ADDITIVES*; viscous liquid that binds the *COLOURANTS* and *ADDITIVES*, which also attaches them to the *SUPPORT* in printing; see *OIL VARNISH*

BLIND EMBOSSEMENT, also ‘blind stamping’: The uninked *MATRIX* is pressed into the *SUPPORT*, leaving a three-dimensional *IMPRESSION* (an embossment) of its relief on the surface of the *SUPPORT*; see also *CASTING*

BLIND STAMPING: See ‘*BLIND EMBOSSEMENT*’

BLOCK PRINTING: See *STAMPING*

BLOCKBOOK: Series of *IMPRESSIONS* taken by *RUBBING* of a series of *WOODCUTS* from which both the text and images have been cut; the printed sheets could be bound together to form a slim volume comparable to a book printed in a *COMMON PRESS* (primarily German, 15th century)

BONE BLACK: A black *PIGMENT* made by charring animal bones (contains carbon, calcium phosphate and calcium carbonate)

BOOK ILLUSTRATION: For the purposes of this publication, any pictorial element printed in a book (including pictorial paratext, such as title vignettes, title borders and printers’s devices)

BOOK PRESS: See *COMMON PRESS*

BRASILWOOD: Wood from a tree (*Caesalpinia echinata*) used to produce a purplish-red *DYESTUFF*; when precipitated, dried and powdered, it can be used as a *COLOURANT* for *INK* or *PAINT*

BRIEFMALER (German: lit. ‘letter-painter’ or ‘document-painter’): Professional painter of ephemeral material, including single-sheet prints

C

CAMAÏEU (French: lit. ‘cameo’): Style of *COLOUR PRINT*, often defined as a subset of *CHIAROSCURO*, printed in closely related tones similar to those of carved cameo stones (primarily French, 17th century)

CARMINE, also ‘crimson lake’ or ‘cochineal’: A crimson *DYESTUFF* prepared from scale insects (e.g., the cochineal, *Dactylopius coccus*); when precipitated, dried and powdered, it can be used as a *PIGMENT* for *INK* or *PAINT*

CARRIER: See *BINDING MEDIUM*

CASTING: Printmaking technique of covering a *MATRIX* – whether inked or uninked – with a fluid or paste-like material (plaster, gelatine, lead, sulphur or wax), which is left to harden and then lifted from the matrix to create a ‘sheet’ of the hardened material with the design (and/or ink) raised in relief (e.g., with *ENGRAVINGS*) or sunken in intaglio (e.g., with *WOODCUTS*); *PASTEPRINTS* may be a form of casts; see also *BLIND EMBOSSEMENT*

CHIAROSCURO (Italian: ‘light-dark’): Style of tonal *COLOUR PRINT* that mimics Italian chiaroscuro drawing (wash drawing), often involving *IMPRESSIONS* of three or more interdependent *TONE BLOCKS* in closely related tones and no independent *KEY BLOCK*; Ugo da Carpi was granted the first privilege for printing ‘*CHIARO ET SCURO*’ in Venice in 1516; see also *CAMAÏEU*

COCHINEAL: See *CARMINE*

COLOUR PRINT: Generic term encompassing any impression of an inked *MATRIX* onto a *SUPPORT*, either monochromatic (in any colour except black) or in any combination of colours (including black)

COLOURANT: One of the three key constituents of *INK*, along with the *ADDITIVES* and *BINDING MEDIUM*; a *DYESTUFF* or a *PIGMENT* that provides colour and opacity

COMMON PRESS: The standard form of press for *RELIEF PRINTING*, which is used for printing moveable type and *MATRICES* such as *METALCUTS* and *WOODCUTS*

D

DRIER: *ADDITIVE* used in the preparation of *OIL VARNISH* to speed up the drying of an oil-based *INK*, often litharge (red, tetragonal PbO)

DRYING OIL: Oil that forms a tough surface film upon exposure to air, typically through the drying process of simultaneous oxidation and polymerisation; examples include *LINSEED OIL* and walnut oil; see also *NON-DRYING OIL*

DYESTUFF, also 'lake': Soluble organic *COLOURANT*, such as *BRASILWOOD*, *CARMINE*, *INDIGO* and *WOAD*; as (precipitated) dry powder, it can be ground with *OIL VARNISH* to produce *INK*

E

EDITION: The total number of *IMPRESSIONS* pulled in one campaign from a *MATRIX* (for images) or a *FORME* or group of *FORMES* (of moveable type)

ENGRAVING: Copper or brass plate into which the design is incised with a burin; the *IMPRESSION* is made by means of *INTAGLIO PRINTING*

ETCHING: Copper, brass or iron plate into which the design is incised by means of a chemical reaction with an acid; the *IMPRESSION* is made by means of *INTAGLIO PRINTING*

F

FLOCK PRINT: *RELIEF* print sprinkled with wool dust while the *INK* is still wet, giving the print a velvety appearance

FORMSCHNEIDER (German: lit. 'block-cutter'): A specialist cutter of (artists') designs into a woodblock to create a *WOODCUT* (German lands, especially 15th–16th centuries)

FRISKET SHEET: Protective sheet inserted into the *COMMON PRESS* to prevent the *SUPPORT* from falling onto the inked *MATRIX* or *FORME*, and protect unprinted areas of the sheet from stray *INK*, often used to print text and images in *RELIEF* in simple or intricate arrangements of red and black

FORME: A body of moveable type and other elements (e.g. initials, *WOODCUTS*) that are locked within a frame; it is mounted on the bed of the *COMMON PRESS* and printed in *RELIEF*

G

GREEN EARTH: A yellowish to bluish green mineral *PIGMENT*, consisting mainly of glauconite and/or celadonite, and that is coloured by traces of iron

GUM: Hardened tree sap (exudate) that is dissolved in water for use as a *BINDING MEDIUM* in water-based printing *INK* or

PAINT; cherry gum (from cherry trees) and gum Arabic (from acacia trees) are common

H

HAND-COLOURING: Manually applying (normally water-based) *PAINT* to a *PRINT*, either by brush or through stencils

HAND-PRESS PERIOD: The period from the invention of the *COMMON PRESS* c.1450 until the beginning of the automation of printing c.1830

I

ILLUSTRATION: See *BOOK ILLUSTRATION*

IMPRESSION: (1) A pull on the press: The transfer of *INK* from an inked *MATRIX* onto a *SUPPORT* by means of *PRINTING*, *RUBBING* or *STAMPING*. (2) A single copy of a *PRINT*. (3) The three-dimensional result of pressing a *SUPPORT* onto a *MATRIX*. Many *IMPRESSIONS* (= copies) of a *CHIAROSCURO* woodcut could be made by superimposing *IMPRESSIONS* (= pulls) of three blocks each in its own colour and together in different *PALETTES*, all of which show a deep *IMPRESSION* (= embossment) into the paper.

INDEPENDENT BLOCK: *MATRIX* of a *COLOUR PRINT* (typically a *KEYBLOCK* printed in black) that produces a legible design (e.g., a 'normal' *PRINT*); see also *KEYBLOCK/KEYPLATE* and *INTERDEPENDENT BLOCKS*

INDIGO: Natural blue *DYESTUFF* (obtained from *Indigofera tinctoria* plants) similar to *WOAD*; as dry powder, it can be used as a *COLOURANT* for *INK* or *PAINT*; synthetic indigo was introduced in the late 19th century.

INK (i.e. 'printing ink'): Substance comprised of a *COLOURANT*, a *BINDING MEDIUM* and *ADDITIVES*, with which the *MATRIX* is covered ('inked') in order to take an *IMPRESSION* of a *MATRIX* or *FORME*; usually oil-based and highly viscous (depending on the kind of matrix to be printed, it can be paste-like or nearly solid); water-based ink can be gel-like and was used especially for *RUBBING WOODCUTS* to produce *BLOCKBOOKS*

INK SQUASH, also 'beaded edges': Excess *INK* that is forced over the edges of the *MATRIX* in *RELIEF PRINTING*; an indicator of *PRINTING* rather than *HAND-COLOURING*

INTAGLIO PRINTING: One of the two major early modern categories of printing, in which the design is incised into the surface of a *MATRIX* by *ENGRAVING* or *ETCHING* a metal plate; *INK* is applied to fill the grooves, excess ink is cleaned from the plate's surface, the *SUPPORT* is placed on top of the plate and pressed into the grooves by running it through a *ROLLING PRESS* to take an *IMPRESSION*

INTERDEPENDENT BLOCKS: *MATRICES* of a *COLOUR PRINT* (typically *WOODCUT*) that produce a legible design only when printed together; see also *INDEPENDENT BLOCK*

IRON-GALL INK: A dark blue-black, water-based writing ink that was common until the twentieth century; tannic acid ($C_6H_2(OH)_3COOH$) and iron(II) sulphate ($FeSO_4$) are dissolved in water to produce a *COLOURANT*, and the *ADDITIVE* gum arabic is mixed in to keep the particles in suspension; if sufficiently thickened with extra gum arabic, it can be used as *INK* for printing *WOODCUTS* by means of *RUBBING* (e.g. for *BLOCKBOOKS*)

J

JIGSAW PRINTING: The *MATRIX* is divided into different pieces that are inked separately (each in one or more colours), fit together on the bed of the press and printed in one run; if different colours of *INK* are applied to different pieces, the areas of colour can be close but will not overlap

K

KEY BLOCK/KEYPLATE: A *MATRIX* of a *COLOUR PRINT* that provides the details of a design, conventionally but not necessarily printed in black; see also *TONE BLOCK*

KING'S YELLOW: See *ORPIMENT*

L

LAKE: See *DYESTUFF*

LAMP BLACK: A carbon black *PIGMENT* prepared from soot, usually used as the *COLOURANT* in black *RELIEF* printing *INK*

LEAD WHITE also 'white lead' or 'basic lead carbonate' ($2PbCO_3 \cdot Pb(OH)_2$): The most common white pigment for oil-based *INKS* until the industrial production of titanium white (TiO_2) in 1916/1920

LINSEED OIL: A *DRYING OIL* pressed from the seed of the flax plant (*LINUM USITATISSIMUM*); the most frequently used oil for *OIL VARNISH*

M

MALACHITE: Bright green mineral *PIGMENT* (basic copper carbonate, $CuCO_3 \cdot Cu(OH)_2$); usually occurs with *AZURITE*.

MANQUE: Unprinted gap in a line of an *ENGRAVING* or *ETCHING* commonly caused by either insufficient *INK* in the groove of the plate or insufficient pressure during printing

MATRIX: Block or plate from which the image is printed (e.g., *ENGRAVING*, *ETCHING*, *METALCUT* or *WOODCUT*)

MEDIUM: See *BINDING MEDIUM*

METALCUT: Metal plate (usually brass) with the design engraved in relief, nailed or pasted onto a woodblock to raise the level of its surface and printed in *RELIEF* in a *COMMON PRESS*

MEZZOTINT: Technique of *INTAGLIO* printmaking in which the surface of a copper plate is roughened with a toothed rocker or roulette and the design is created by scraping away and polishing the resultant burr; it was invented in 1642 and was the first printmaking method that allowed for continuous gradation of tone

MINIUM: See *RED LEAD*

MONOCHROME: An *IMPRESSION* in any single colour (except black); see also *POLYCHROME*

N

NATURE PRINTING: Using a natural object, such as a tree leaf, as a *MATRIX* to be inked and printed in *RELIEF* (or, rarely, in *INTAGLIO* or both at the same time)

NON-DRYING OIL: Vegetable oil that does not oxidise nor polymerise, i.e. does not dry, such as olive oil

O

OCHRE: *PIGMENT*, containing iron oxides (Fe_2O_3) (hydrated or not) with associated clays and quartz; occurs in a range of hues, often brownish yellow (yellow ochre) but also reddish (red ochre) or brownish (brown ochre)

OIL VARNISH: General term for a *BINDING MEDIUM* for oil-based printing *INKS*, either for *INTAGLIO PRINTING* or *RELIEF PRINTING*; prepared by heating a *DRYING OIL* at c.300°C

ORPIMENT, also 'King's yellow': Brilliant, intense yellow natural *PIGMENT* (arsenic sulphide, As_2S_3) used as a *COLOURANT* in printing *INK*

P

PAINT: A liquid or semi-liquid substance, comprising a *COLOURANT*, *BINDING MEDIUM* (usually water-based) and possibly *ADDITIVES*; used for *HAND-COLOURING* a *PRINT*

PALETTE: Any combination of colours of *INK* used in an *IMPRESSION* or *PRINT*, especially used to describe *CHIAROSCURO WOODCUTS*; see also *STATE*, *VARIANT* and *VERSION*

PASTEPRINT: Three-dimensional multiple made from the 1460s to the 1520s, apparently produced by either *CASTING* a *MATRIX* or pressing a matrix into a resinous paste on paper

PIGMENT: Insoluble inorganic *COLOURANT*; see, for example, *AZURITE*, *BONE BLACK*, *GREEN EARTH*, *LAMP BLACK*, *LEAD WHITE*, *MALACHITE*, *OCHRE*, *ORPIMENT*, *RED LEAD*, *UMBER*, *VERDIGRIS*, *VERMILION* and *VINE BLACK*

POLYCHROME: A *PRINT* inked in more than one colour (including black); see also *MONOCHROME*

PRESS: Machine used to take an *IMPRESSION* on a *SUPPORT* from a *MATRIX*; see *COMMON PRESS* and *ROLLING PRESS*

PRINT: An *IMPRESSION* (or a series of impressions) of a *MATRIX* (or matrices) onto a *SUPPORT* by means of *PRINTING*, *RUBBING* or *STAMPING*; see also *BLIND EMBOSSEMENT*

PRINTING: Applying *INK* to a *MATRIX* (e.g., *ENGRAVING*, *ETCHING*, *METALCUT* or *WOODCUT*), covering the inked matrix with a *SUPPORT* (paper, textile, etc.) and running it through a *PRESS* to make an *IMPRESSION*; see also *RUBBING* and *STAMPING*

PRINTING INK: See *INK*

PRINTING IN REGISTER: *IMPRESSIONS* of several blocks or plates (see *MATRIX*) are superimposed on the same *SUPPORT*; *INTAGLIO PRINTING* and *RELIEF PRINTING* may be combined

R

RED LEAD, also 'minium': A bright red-orange synthetic *PIGMENT* (Pb_3O_4)

RELIEF PRINTING: One of the two major early modern categories of printing, including *MATRICES* with the unprinted areas cut away so that the design is effectively raised (e.g., *METALCUT* and *WOODCUT*) and moveable type set in a *FORME*. *INK* is applied to the raised surface of the *MATRIX* or *FORME*, the *SUPPORT* is placed on top and pressed against the inked surface, either on a *COMMON PRESS* or by means of *RUBBING* or *STAMPING*, to make an *IMPRESSION*

ROLLER PRESS: See *ROLLING PRESS*

ROLLING PRESS, also 'Roller press': Kind of printing press used for *INTAGLIO PRINTING* that provides much more pressure than a *COMMON PRESS*, which is necessary for pressing the *SUPPORT* into the grooves incised into the surface of the *MATRIX* in, for example, *ENGRAVING* and *ETCHING*

RUBBING: Applying ink to a *MATRIX*, covering it with a *SUPPORT*, possibly then covering the *SUPPORT* with a resilient material such as felt and then a hard and smooth material such as parchment, and manually rubbing the stack to make an *IMPRESSION*; see also *PRINTING* and *STAMPING*

S

STAMPING, also 'block-printing': Applying *INK* to a *MATRIX* for *RELIEF PRINTING* and manually pressing it onto a *SUPPORT* to take an *IMPRESSION*; see also *PRINTING* and *RUBBING*

STATE: A form of a print defined by deliberate (not accidental) alterations to a single *MATRIX*; an *IMPRESSION* of each such change or group of changes defines a new state of that matrix. For multi-matrix colour prints (e.g., *CHIAROSCURO WOODCUTS*), each matrix may be in a different state; see also *PALETTE*, *VARIANT* and *VERSION*

SUPPORT: The material onto which *INK* is transferred from a *MATRIX* or *FORME* by means of *PRINTING*, *RUBBING* or *STAMPING*; e.g., fabric, paper, parchment and leather

T

TONE BLOCK: *WOODCUT* that provides areas of colour to an *IMPRESSION* of a *KEY BLOCK*, *KEYPLATE* or groups of *INTERDEPENDENT BLOCKS* (e.g., *CHIAROSCURO* woodcuts)

U

UMBER: Brown natural earth *PIGMENT*, containing hydrated iron oxide ($\text{Fe}(\text{OH})_3$) and manganese dioxide (MnO_2) with associated minerals such as calcite and quartz

V

VARIANT: Deliberate alteration to the production of a *COLOUR PRINT* from multiple matrices that involves no deliberate changes to any *MATRIX*, e.g., by omitting or replacing one matrix; see also *PALETTE*, *STATE* and *VERSION*

VARNISH: See *OIL VARNISH*

VEHICLE: See *BINDING MEDIUM*

VERDIGRIS: Synthetic bright blue-green to celestial blue *PIGMENT*; general term for closely related neutral or basic forms of copper acetate ($\text{Cu}(\text{CH}_3\text{COO})_2$) with varying degrees of hydration; historically, many copper green pigments have been called 'verdigris'

VERMILION: Brilliant red *PIGMENT* (HgS) that can come from a mineral source (cinnabar) or, more often, be synthesised from mercury and sulphur; frequently used as a *COLOURANT* in red *INK* and *PAINT*

VERSION: Nearly precise copy of an existing *MATRIX* or group of matrices in a *CHIAROSCURO WOODCUT*; see also *PALETTE*, *STATE* and *VARIANT*

VINE BLACK: Black *PIGMENT* made by charring the tendrils of vines that was typically used as the *COLOURANT* of *INK* for *STAMPING* fabric

W

WOAD: Natural blue *DYESTUFF* (obtained from *Isatis tinctoria* plants) chemically similar to *INDIGO*; as dry powder, it can be used as a *COLOURANT* for *INK* or *PAINT*.

WOODCUT: *MATRICES* are cut with a knife and gouge from the grained sides of woodblocks; the *IMPRESSION* is taken by *RELIEF PRINTING*, either manually (by *RUBBING* or *STAMPING*) or mechanically (in a *COMMON PRESS*); see also *METALCUT*

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